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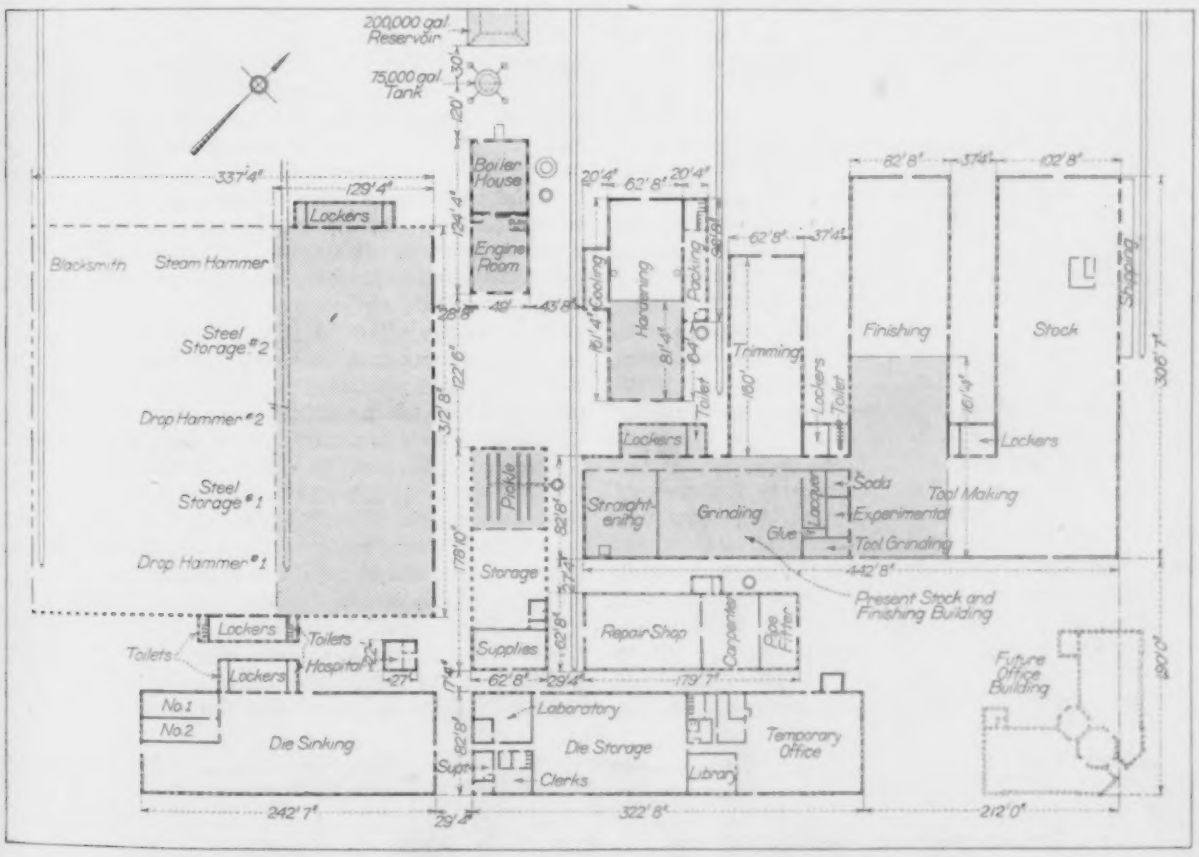
Williams Drop Forging Plant at Buffalo

Why the Site Was Selected—An Unusually Interesting Case of Industrial Works Designed for Present and Future Needs

A notably valuable contribution to the fund of information concerning the design of industrial plants is obtained through the new works of J. H. Williams & Co. in outlying Buffalo. The plant is also interesting as an example of the study of conditions which should be considered carefully before a new factory site is selected, and it is informing in its illustration of the remarkable expansion which the drop forging industry has enjoyed. In this development of a new manufactory, the design represents the capitalization of the company's years of experience in its Brooklyn works. That the Williams Company has been pressed for productive capacity for some time has been well known, but that its belief in the future as represented not only by the proportions of the present new Buffalo plant but by the possibilities for expansion there is hardly so widely apprehended.

The business of J. H. Williams & Co. was established in 1883 and acquired what is even now a large area for industrial purposes. As the business grew the expansion had to be accommodated not solely in the horizontal direction but also vertically, but with new lines added it necessarily followed that departments could not be related one to the other to facilitate to the highest degree economical handling of the product in process of manufacture. The development of the automobile and the large number of automobile parts made of drop forgings has aggravated the situation, and while departments were rearranged from time to time and new equipment added, it finally became obvious that the



The Shaded Portion Shows the Present Extent of the Buffalo Plant of J. H. Williams & Co. The Plan in its Entirety Shows How Provision is Made for Future Expansion, Though the Various Buildings May Be Continued Even Beyond the Lines Marked for Later Steps in Enlargement

Temporary End of the Forge Shop Showing the Monitors Over the Heating Furnaces and the Sawtooth Construction in Addition Over the Steel Storage Bays

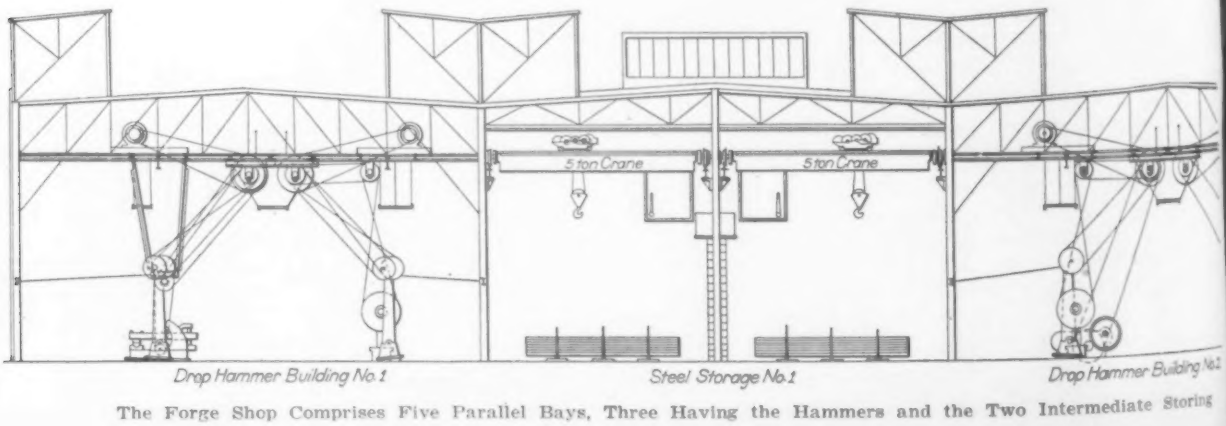
most desirable way to take care of expansion and to reduce unit cost of manufacture was to build an entirely new plant.

Owing to the large proportion of the output which goes into the automobile, it was desirable, other things being equal, to locate in a part of the country favoring shipment to the automobile manufacturer, but it was also desirable to maintain a position as central as possible with regard to the general market for the Williams drop-forgings, important among which as articles manufactured for stock are an extensive line of wrenches, hoist hooks, C clamps, lathe dogs and other machine shop tools, as well as the Vulcan and Agrippa chain pipe wrenches and the Vulcan chain pipe vise. Without going into the conditions surrounding other sites considered, Buffalo, N. Y., was selected partly because of the proximity of a large labor market, the opportunity to get abundant electrical power at favorable rates and a situation which would still make the company an eastern concern capable of supplying its present market satisfactorily and having water and railroad facilities for shipment to manufacturers east and west. At this writing the Buffalo plant is in operation in part but the equipment has not been completed. Much of the machinery at present utilized is being brought from the congested Brooklyn plant, but both plants are to remain in operation indefinitely. It has not been established to what extent the company will withdraw from Brooklyn, particularly as the company does a large business in contract work for drop forgings and for case hardening.

One of the particularly impressive features of the design of the new plant is the large scale on which it has been laid out, comprehending easy expansion in successive stages to meet future demand. The company purchased an area much beyond even the needs of the most hopeful view of possible expansion, and this is an interesting detail, as it is proposed to dispose of parts of this for other industrial developments which may be attracted by the general situation as it exists today together with the immediate industrial community which the Williams plant will develop.

As the accompanying plan shows, the works are planned to grow about a central point. At one hand is the forge shop where the material is heated and forged by steam hammers or board drop hammers, and on the other is the department for finishing and shipping stock. Expansion in plant may be accommodated in opposite directions from this point. The plant requires also a department for pickling the material, and one for heat treating. These are centrally located as is also the power house for supplying the steam needed for steam hammers, for controlling the distribution of the electric current for motors and lighting, for centralizing the heating plant and for supplying compressed air. The plan shows not only the buildings at present erected and the additional buildings which will be provided for from time to time and the way in which the different buildings may be enlarged, but indicates also the future temporary ends beyond which the buildings may be continued even outside of the lines of the plan. Some of the work which will ultimately make the Buffalo plant altogether self-contained is, of course, done at the Brooklyn plant, and the present occupancy will be shifted to the ultimate intention of use. For example, the stock and finishing building at the present time accommodates in one corner the works office and also the grinding, straightening and other finishing work necessary. How these departments will later be disposed is indicated in the plan. One other interesting aspect of the plan is that the railroad connection is sufficiently distant for sidings to be made from time to time to suit conditions. For example, the plans show existing and proposed sidings, which obviously may be located substantially at any point desired.

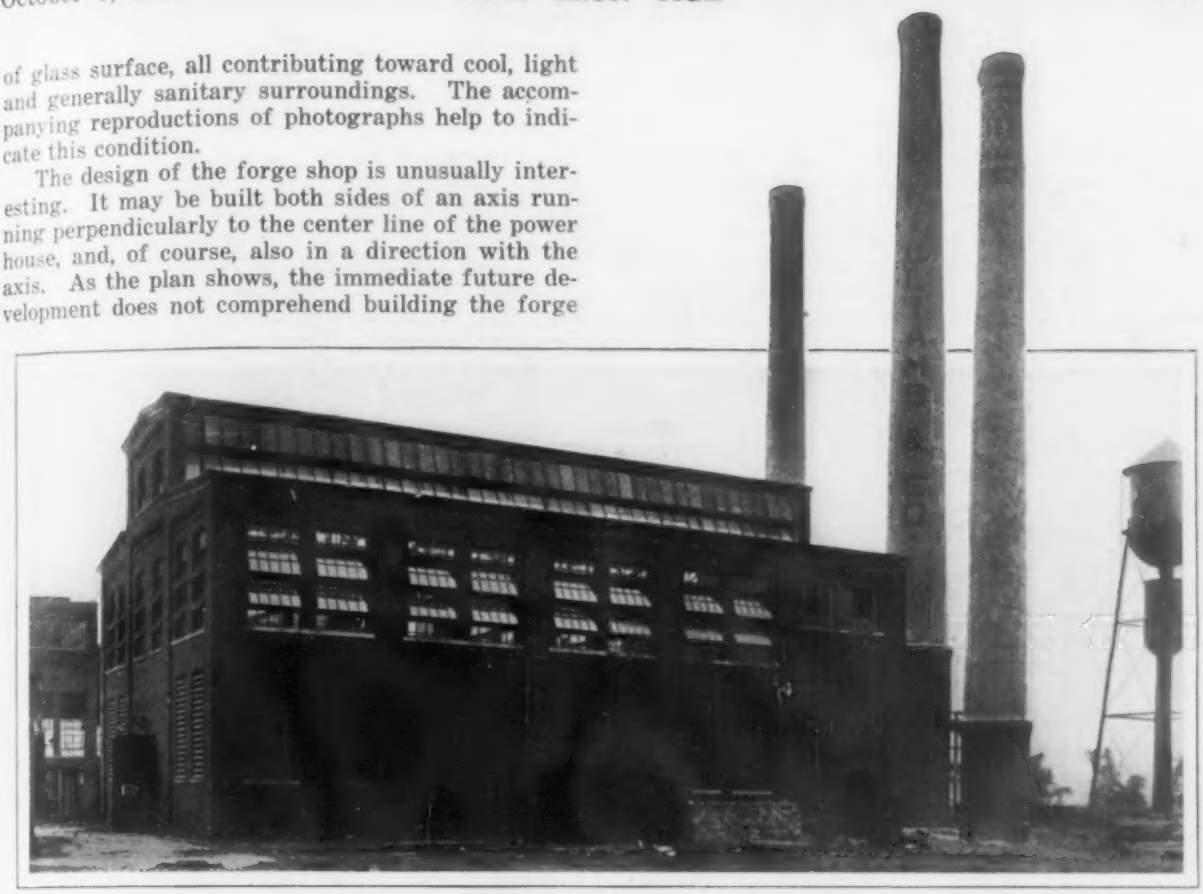
The conspicuous things about the buildings themselves are their substantial construction, their unusually lofty interiors and the generous amount



The Forge Shop Comprises Five Parallel Bays, Three Having the Hammers and the Two Intermediate Storing

of glass surface, all contributing toward cool, light and generally sanitary surroundings. The accompanying reproductions of photographs help to indicate this condition.

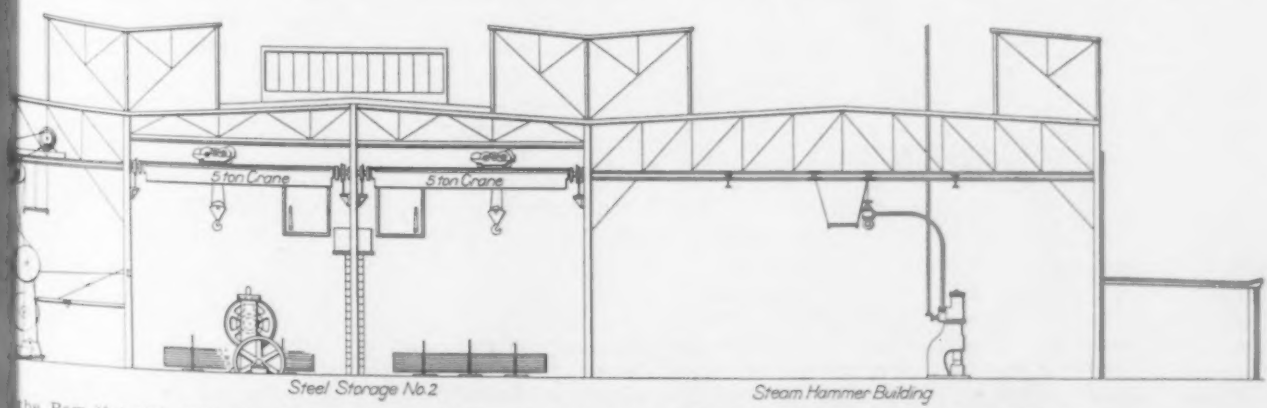
The design of the forge shop is unusually interesting. It may be built both sides of an axis running perpendicularly to the center line of the power house, and, of course, also in a direction with the axis. As the plan shows, the immediate future development does not comprehend building the forge



The Case-Hardening Building. The Middle Chimney Belongs to the Power House, While the Others Serve the Case-Hardening Building

shop on the opposite side of the axis to that shown, but rather the present expansion is to be in the axial direction. The various buildings of the plant are served from the power house by means of an underground tunnel and the steam hammers of the forge shop are located in the bay of the building first reached by the tunnel or nearest the boiler plant. Then in succession the bays of the forge shop comprise a steel storage bay, holding material ready for the heating furnaces; then a bay for drop hammers; then another storage bay and finally a second drop hammer bay. A cross section through this shop is included among the illustrations. The steam hammer bay is 66 ft. in width while the drop hammer bays are 60 ft., and over the line of columns separating the bays is a monitor form of roof, practically all glass in the upright sections, with movable sash, as indicated in the photograph of the forge shop. Half of each monitor lights one bay and the other half the adjoining bay, with a half monitor at the ends of the building. The heating furnaces are located directly under the monitors, thus to secure adequate ventilation.

Each storage bay has an intermediate line of columns dividing it into two craneways. Material to be manufactured is placed in racks underneath the cranes. As each hammer bay provides for a double row of hammers with the corresponding heating furnaces, there is a crane for handling material for each row of hammers, practically. In addition to the monitors and glass lights in the sides of the building, a few saw teeth have been provided in the roof over each storage bay, these being indicated in the general photographic view of the forge shop. The main trusses of the building are located at 16 ft. centers and over every other 16-ft. section thus formed is the saw tooth, 25 ft. wide and with a continuous steel sash in the vertical member. Two of the craneways are equipped with Northern cranes and two with Shaw cranes, all fitted to use a lifting magnet, and the crane cabs are reached by a stairway as a safety measure. The steel stock for manufacture is stored in the open in an interesting fashion. Extending along the floor in each of these bays are three lines of 60-lb. tee rails 6 ft. apart. The rails are spiked to 2 ft. 10 in. lengths of wooden railroad ties, which are set in a cinder ballast tamped around them. To the rails at points desired are clamped by means of bolts, upright steel bars forming adjustable



the Raw Material, with Heating Furnaces Between Material and Hammers and Underneath the Roof Monitors

spaces or compartments between uprights so that the material, commonly various sizes of bars, may be piled up across the rails, each size and grade in its separate section.

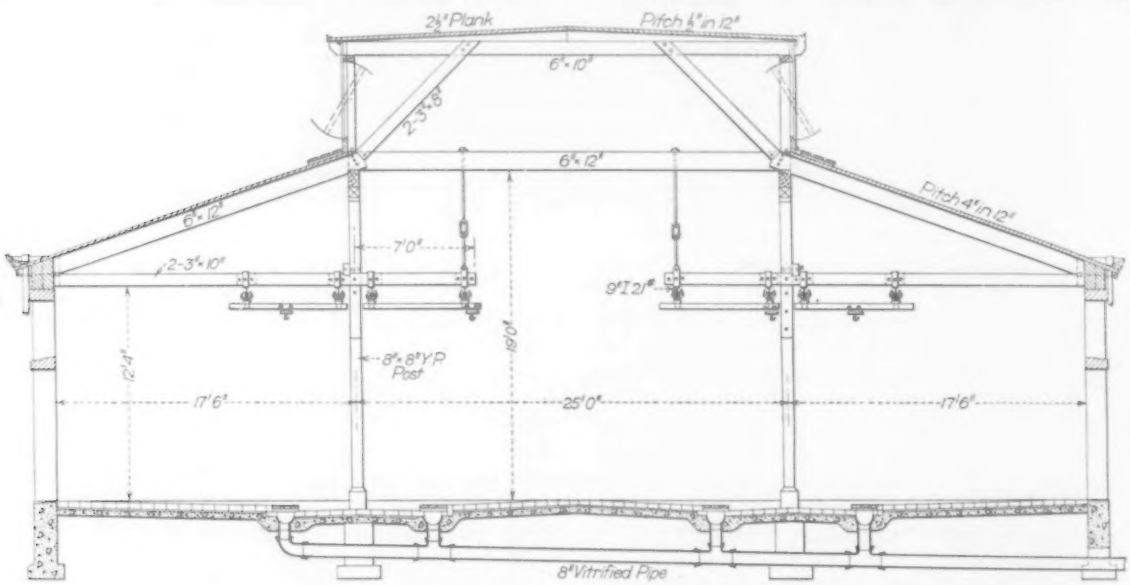
Oil burning heating furnaces are used with the air blast supplied from the power house through an air main in the underground tunnel. Opposite each line of furnaces this air pipe is tapped. In general each heating furnace has an asbestos heat guard for the protection of the operator. The guard hangs in front of the furnace and below it is a blast pipe with perforations so that with the air issuing at some velocity the flames of combustion are deflected and prevented from issuing underneath the asbestos screen into the face of the furnace attendant. The hammers are set on concrete foundations on top of which are bedded yellow pine timbers. In connection with each line of hammers a direct connected motor driven fan is installed for removing scale from the hammer anvil as the forgings are made. The cross section of the forge shop indicates how the motor driven hammers are belted to line shafts overhead. Paralleling the line shafts are suspended walkways with suitable railings and, to improve safety conditions further, extension platforms are hinged to these walks to get at counter shafts when necessary, these platforms having their outer ends hooked to suspending rods from the roof trusses. Incidentally the revolving machine parts are guarded, largely by wire mesh guards. To facilitate handling the waste material and the trimmed material which is carried to the pickling department nearby, a gangway or walk of brick paving extends along the end of the building near the center line of the plant or parallel with the tunnel. The forge shop contains shears, upsetting and other incidental machinery.

The pickling building is built of wood trusses and sides, as a material sufficing to withstand the corrosive fumes developed in pickling, and a cross section is included among the drawings. It is arranged for four lines of pickling tanks with wood racks in front of them for a footing and each line is served by hand-operated hoists mounted on a light traveling crane composed of the Coburn form of track suspended from I-beams, as indicated in the illustration. The building has brick walls and vitrified brick floor and numerous doors of wood, few of them with glass, but thus allowing for a maximum amount of opening when atmospheric conditions admit of immediate communication with the outdoor atmosphere as a means for maintaining a satisfactory indoor air.

The character of the case-hardening building is indicated by a reproduction of a photograph of it. The picture shows a large monitor top which assists, with its long expanse of movable glass, in maintaining a cool atmosphere. It contains at the present time two double hard-coal burning furnaces, and one smaller double furnace. The two chimneys are at present outside of the building, but with the extension of the building they will be near the cross center line of the building.

What is now called the stock and finishing building is partitioned so that along one side there is a wood-block gangway for trucking, this being the part along which parts from the pickling and hardening buildings will be carried toward the finishing departments and for loading on freight cars. This gangway takes the shape of a corridor with skylight overhead and serves also as a continuation of the tunnel, the piping and electric conduits from the tunnel being carried overhead in the corridor.

Otherwise this building has a maple flooring and a steel frame saw-tooth roof, supported by cast-iron columns. The bottom chord of the trusses consist of two light channels back to back with distance pieces between so that shafting hangers can be readily bolted to the pair of channels or timbers may be likewise bolted for carrying motors, for example. The brick walls are painted a dark green for about 6 ft. high from the floor as a wainscoting and the walls are gray white above. The roofing is a fireproof slab composed of plaster of paris and shavings; strong and light, also heat and cold proof. The building is lighted by pendant electric lights in green shades, white lined, and is heated by hot water by means of long wall coils below the windows and with small double coils just under the roof skylights. The hot water heating system utilizes the exhaust from steam actuated machinery in the power house and is interesting in that it is piped along what in electrical distribution is known as the loop system. In other words, the return pipe starts from a point near the power house and goes away from it to the most distant point before it is turned back again to run to the power house; the idea is that each section of the heating system shall receive water traveling the same distance and thus likely to give the same temperature drop, instead of the possibility otherwise that some sections of the heating system might rob oth-



The Wood Frame Pickling House with Vitrified Brick Floor Providing for Four Parallel Lines of Tanks with Overhead Trolley Hand Hoists

ers through short circuiting. This building is equipped with sprinkler heads of a fire extinguishing system. The window lights are of ribbed glass with movable sections.

The power house like the rest of the plant is notable for its lofty interior. It is divided into two general sections. One contains the boilers, the present installation comprising two Stirling boilers of 250 hp. capacity with space for two others, and the other part having the auxiliary apparatus on one level and above it the switchboard to control the electric distribution and a General Electric turbo-blower for supplying the air blast for the heating furnaces. The boiler house has a monitor roof; the walls are of a gray white; there are overhead walks to reach boiler valves readily, and in one corner is located the boiler feed pumps, feed water heater, etc.

The turbo-blower mentioned is driven by a 50-hp. steam turbine, operated non-condensing, so that steam is available for heating purposes when needed and it delivers air at 2½ lb. pressure. This air is carried through the tunnel in a main about 20 in. in diameter of spiral riveted pipe. Besides this in the tunnel, which is about 7 ft. in inside hight, and 6 ft. or more in width, there are the two hot water mains, high-pressure steam lines and the electric conduits. The electric power lines are received at high potential in a corner of the power house walled off with only an outside entrance. In this are located the transformers and switches. The switchboard within the power house is a local distributing board with the usual complement of wattmeters and indicating instruments.

The hot water heating system was installed by the General Fire Extinguisher Company, Providence. It includes an Alberger steam turbine driving an 8-in. volute Alberger pump for maintaining the circulation. The other apparatus includes the fire pump, the general service pump, the domestic hot water heater and the oil service pumps for the furnaces. In connection with the water supply there are two overhead tanks shown in the illustrations, one holding 75,000 gal. for the sprinkler system and the lower one 20,000 gal. for house service, and back of these has been built a 200,000-gal. concrete reservoir, so that while the plant has connections at city pressure, it is assured an abundant supply of water for use in the emergency. The grounds are provided with a fire protection system which includes hydrants and hose houses, these built with slat floors to allow for the adequate ventilation necessary to preserve hose as long as possible.

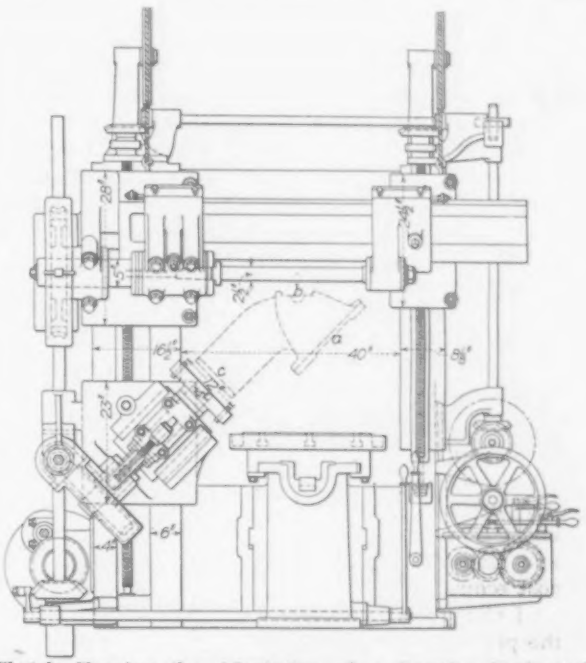
Mention should be made of the toilet rooms provided throughout the plant. These are large and airy, commonly equipped with long white enameled sinks with both hot and cold water supply; individual lockers, and shower baths of two compartments, one compartment providing for disrobing and constituting an arrangement different from the more public form of shower baths sometimes noted. These toilet room annexes are built of brick and they have concrete floors with red composition finish.

R. S. Baldwin, assistant to the president of the company, had charge of the design and erection of the plant.

Walter B. Snow has removed his offices to rooms 511-516 in the new Federal Street Building, 136 Federal street, Boston, Mass. In its new quarters his organization, which has been carefully built up in the past seven years, will be still better equipped to act as publicity manager and general advertising agent.

Adapting a Machine for Special Work

A field service department is maintained by the Newton Machine Tool Works, Inc., Twenty-third and Vine streets, Philadelphia, Pa., for passing upon the necessity of building machines to meet the requirements of particular cases. The function of this department is to investigate instances of this



Sketch Showing the Adaptation of a Regular Horizontal Milling Machine for Machining a Small Air Compressor Frame

nature and determine whether or not it will be possible to turn out the products in question quicker and cheaper by adapting some of the standard machinery already built.

An interesting case of this kind is that of a small air compressor frame, which is indicated by dotted lines in the accompanying drawing. Under the old methods the face was finished at *a* to give a working surface from which the flange *b* and the cap fits *c* might be located. The latter were milled with face cutters which should be the exact width of the tongues. As this condition was not practical it was necessary to take one cut along each side of the cap, thus making four operations in all. An investigation by the field service department indicated that one of the company's horizontal milling machines with an adjustable spindle mounted on the left upright at a fixed angle of 45 deg. and having hand vertical adjustment would enable the casting to be machined with one setting of the work, thus eliminating the necessity of planing the bottom to provide a locating point. As is shown by the layout, the flange was finished by the angular cutter and the cap fits were machined by a combination of cutters mounted on the horizontal spindle. These cutters were divided by an adjustable spacing washer which permitted them to be adjusted to give any desired width of tongue, the depth of the tongue being always standard in this work. In this way not only was time saved in the machining of the work, but the adaptation of a standard machine gave both low initial and maintenance costs.

The sale of the plant of the Wisconsin Engine Company, Corliss, Wis., bankrupt, for $120,000, has been ordered set aside and a new sale held. The court declares the former proceedings grossly irregular. The resale was ordered on petition of the Titusville Forge Company and the Bosch Magneto Company.

Committees for Controlling Manufacture*

Gaining Co-operation by Giving Foremen a Voice in Solving Factory Problems—Committees for Sales and Executive Management

BY C. U. CARPENTER†

Foremen are the real representatives of the company to the workmen. It is their interpretation of ideas and ideals that count with the men. The men's opinion of the company is made up of their opinion of the foreman. Two-thirds of the waking hours of their daily life are under his control Their promotions, their increases in pay, their good or bad jobs, depend upon his whim, his sense of fairness.

The method of management usually adopted is that of placing all of the responsibility upon the shoulders of the superintendent and so overload him with details that the best results cannot possibly be secured. If a shop is large enough to have several assistant superintendents, the same conditions of overloading usually prevail with them. Such a system gives rise to the condition where these valuable men are so overwhelmed with comparatively petty details, that they have no time to give to the larger and important problems of effective management, cost economies and future progress.

I claim that organization must be founded upon the principles of:

1. Education and development of the best that there is in a man.
2. The arousing of interest and enthusiasm in the work.
3. Absolute fairness and justice.
4. Team play or "a working together for a common end."

I consider that the ordinary one-man organization as I have seen it, with overloaded superintendent, jealous, back-biting, unimproved foremen, surly, discontented, dead-level workmen, with no vim nor spirit to them, does not fall within these principles and is not efficient. I claim that a properly developed committee system, properly carried out, will fulfill the requirements of these principles.

All committees should be of an advisory character. The factory manager or superintendent should always be the chairman and the deciding factor of the main committee which may be termed the general factory committee. The other committees should have at their head, either the superintendent or one of his assistants.

GENERAL FACTORY COMMITTEE AND ITS WORK

The general factory committee should be the court of last resort on all important subjects, and should have the final decision on all actions taken by any subsidiary committee. The members of this general factory committee should be selected with great care, with a view to having the brightest, most progressive men in the shop on it. Ordinarily the personnel may consist of, in addition to the superintendent, the chief engineer or designer of the product, the head of the tool room, at least three foremen and whatever assistant superintendents the shop may have. The head of the cost department may also well be a member of this committee. Accurate notes of action taken are necessary. A capable stenographer to act as secretary is always valuable, for he can often straighten out many a difficulty between meetings, and the knowledge of shop conditions that he will absorb, will prove of great value.

The work of the general factory committee should cover:

1. Consideration of routine work, both stock and contract, and of progress upon this work. This is of great importance.
2. Consideration of possible economies and the systematic planning of cost reductions. The mere starting of a general discussion on cost reductions often opens up a surprisingly large field for this highly important work. Reports by foremen upon economies previously assigned should invariably be required, so that progress upon these very important ideas may be insured.
3. Consideration of plans to standardize product and also new methods of design, together with reports upon actual progress made upon new ideas already introduced into the factory. This latter is a most important subject, for the way in which valuable ideas bravely begun can be totally buried and lost sight of in the press for the every-day output is often discouraging.

The number of meetings to be held will depend on the character of the business, usually two a week will suffice. There should be stated times for these meetings and nothing should be allowed to interfere with them.

SUBSIDIARY COMMITTEES

Most companies manufacture several different lines of product or a number of important variations upon the main product. Each line should have its own committee, formed along the lines of the general factory committee. Each committee should be made up of the foreman handling that particular line of product, and the superintendent or one of his assistants should be chairman. Other members of the factory committee should be called into these meetings, and the same stenographer should act as secretary for both the subsidiary committee and the general factory committee. This last point is important when you consider how much information of great value to a first-class superintendent, a bright man in this position will absorb.

By arranging so that each line of product will have its own committee, and putting on each committee the foreman who handles that particular line, it will be seen that it is possible to get each foreman on at least one committee and sometimes two or three. Each foreman, therefore, gets the educative influence of this get-together plan. He feels his importance as a helpful member of a real organization. In my own experience, throughout a long term of years, I have seen foremen so altered by this method of procedure, inside of a year, that you would not recognize them as the same men, so efficient had they become.

MEETINGS OF JOB BOSSES

In a large concern, it is often an excellent practice to sub-divide the workmen in a department into small groups, ranging from eight to twelve, and then to place over each group, one of the efficient workmen, selected as "job boss," who will con-

*From a paper read before the Efficiency Society, Lake Placid, N. Y., September 18.

†President Fire-Proof Furniture & Construction Company, Miamisburg, Ohio.

tinue to do his daily work at the bench or machine, but will exercise a subordinate supervision over his group. For this, he will receive a small increase in his daily pay. He will not have the right to hire or discharge men, nor will he have anything to say relative to promotions or increases of pay. Naturally, these men cannot be taken away from their work very often, without crippling the output, but short and sharp meetings with them every two weeks are advisable, for upon these men ultimately falls the responsibility for putting through many a project successfully. Among these men too are your future foremen, and the development of the best ones among them is of prime importance. The good effect upon the workmen of a careful selection of these job bosses, based only upon efficiency, and the proper education of these men, can hardly be overestimated.

MAINTAINING PROGRESS OF WORK

I call particular attention to the item on the programme for each and every committee referring to "consideration of routine work." The secretary of the committee will have proper progress report forms, showing: 1, name of job; 2, required time of shipment and delivery; 3, a number of columns representing each department in which a portion of the work will be done. Twice a week each foreman enters the meeting, prepared to report on his department's progress on each job. He already knows when he must get it out of his department to meet the shipping date. Each man wants to present a clean slate. Results: 1, discovery of causes of delays; 2, each foreman pushing work in proper sequence; 3, each one knowing what he has ahead of him; 4, quick action; 5, doing away with much system.

MEETINGS OF GENERAL FOREMEN

Once a month a general foremen's meeting should be held, which should be attended by the superintendent, the members of all committees, and all foremen and assistant foremen. The presence of at least one of the higher officials of the company is advisable.

At these meetings the heads of the several committees should touch upon the important problems before their particular committee requiring solution. Progress of important work should be discussed. Each man should be required to make a statement, concerning the condition of his own department, and whether or not he is suffering any delays on account of other departments. With the knowledge that they cannot possibly "get away" with anything but the truth before their fellow-foremen and committeemen, they will, themselves, develop many an interesting situation and uncover for you many a sticking point. You may be sure that each and every foreman will strive to his uttermost to present a clean slate before such an audience.

It is very profitable to discuss departmental records for each past month. These records can include such subjects as output, departmental expense, reduction of costs and suggested improvements.

Most factory managers, while recognizing the value of scientific management, realize, too, the difficulty in the way of introducing it. While the first difficulty appears to be the attitude of the workmen, it is not so. It is the attitude of the foremen. Too much of their authority is taken away by a planning department, and the result may show up inefficiency. Why not reverse the method, and, after deciding on the essentials of your plan, let these men help, whose heads are full of information of the real kind.

COMMITTEES FOR THE SALES DIVISION

The same principles of committee organization and work apply to the sales division; indeed, with peculiar force, because, in this work, it is not a question of machinery men's methods, but it is a question of the individual who is away from control most of his time. In this division there may be general sales committee, subsidiary sales committees, if the company is large and the product varied, and an advertising committee.

The general sales committee may be made up of chairman, general sales manager, his assistants; office manager; advertising manager; secretary of committee; the general manager. This committee should consider such questions as:

Volume of sales needed to meet desired profit.
Sales price vs. factory costs.
Orders on hand, unfilled.
Allowable sales expense.
How to develop new territory.
How to get items of new possible customers.
How to cover territory.
Salesmen's daily reports.
How to get and train salesmen.
How to sell standard goods.
How to work out orders, and the necessity for full reports on new customers, in order to properly determine credits.
The securing and training of agents.
Competition: its nature and how to meet it.
Needed improvements in goods in order to meet market conditions or best competitors.

COMMITTEES FOR THE EXECUTIVE DIVISION

Proper committees in this division are of great value. The greater the responsibility, the greater the need for co-operation. The committees here vary, of course, according to the needs of the business. Ordinarily, an executive committee and a finance committee are ample.

The executive committee may be formed of the president, vice-president, general manager and treasurer. In the case of large corporations with many vice-presidents, each one may head a subsidiary committee of himself as chairman with the heads of his department under him. To this executive committee will come up condensed formed reports of the findings of the finance committee, the general sales committee, and the general factory committee. All of these are absolutely co-related.

The finance committee reports upon findings as to the relationship of orders, output, expenses. It can give an accurate forecast of prospective financial conditions for months ahead. This forecast is often the guide to the executives for actions as indicating possibly a necessary increase in sales, or reduction in expenses.

The finance committee may be made up of the treasurer as chairman, auditor, general manager, general sales manager, general factory manager. The unusual suggestion of having the factory and sales managers on the finance committee is made because in the last analysis the finances depend upon price, sales and output.

The general manager committee may be made up of general manager as chairman, with general sales manager and factory manager as members, with possibly a few assistants. Its work would consist of a review of the work of the other committees. The outlining of policies for the sales manufacturing division to follow in view of the decision of the executive committee.

The Cutler-Hammer Mfg. Company, Milwaukee, Wis., has removed its Cincinnati office from the Fourth National Bank Building to larger quarters, the new address being room 812, Gwynne Building. Horace L. Dawson is manager.

The New Gary 36-Inch Slabbing Mill

Power Developed by Waste-Heat Boilers—Modified Hydraulic Manipulators and Hydraulic Slab Scale—Forging, Axle and Tie Plate Billets Also Rolled

The largest slabbing mill in the world was placed in operation at the Gary works of the Illinois Steel Company about July 1. With respect to size the mill is in harmony with the scale upon which the entire plant has been built. In general design it may be compared with the slabbing mill of the National Tube Company at McKeesport, Pa. The mill is located to deliver its product under the slab yard cranes and in turn by direct transfer to the cranes serving the heating furnaces for the plate mill. In the general drawing, Fig. 1, the arrangement of the slabbing mill is shown. There was a need for this new unit principally for furnishing the slabs for the plate mill formerly supplied in the form of slab ingots cast at the open-hearth plant, but overflow capacity is also added to the billet mill, particularly for pieces 6 x 6 in. and larger. The use of rolled slabs also reduces the amount of work required on the plate mill. In addition a plant is provided for using the power developed from the installation of waste heat boilers recently built to utilize the residual heat from two open-hearth batteries.

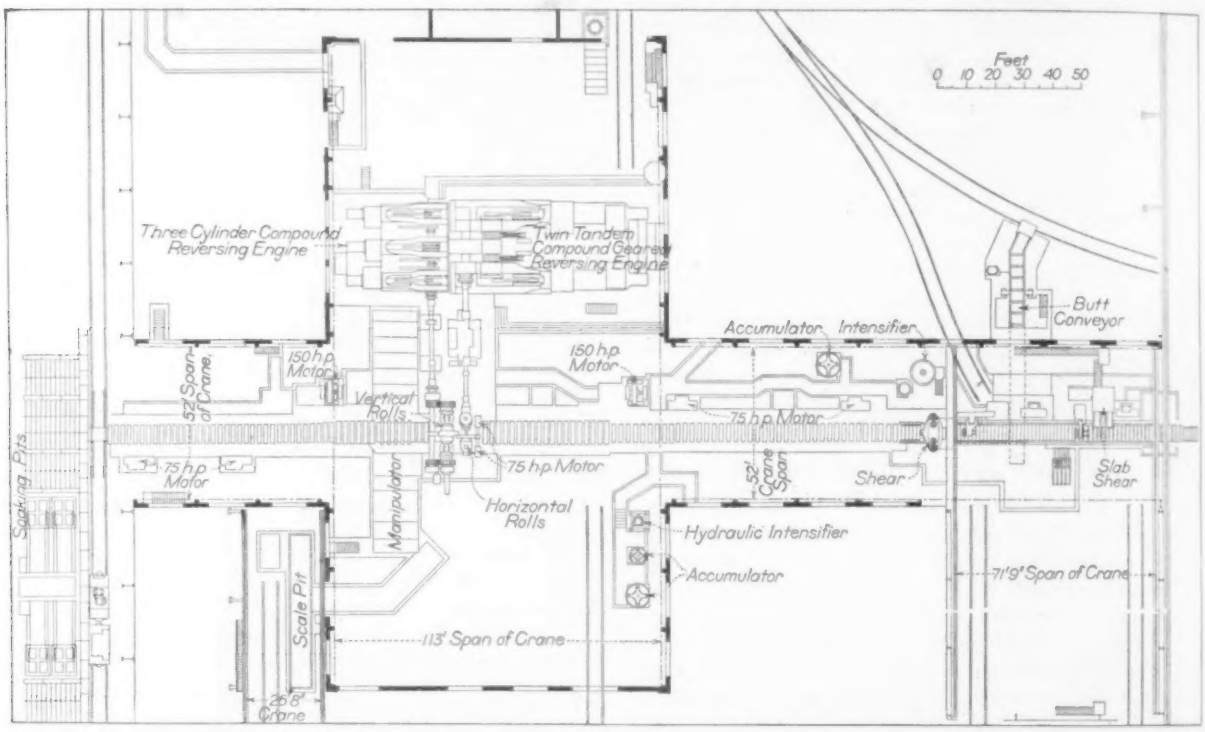


Fig. 1—Plan of the Slabbing Mill, Gary Works of the Illinois Steel Company

The mill is impressive in the size of its housings and the substantial proportions which characterize the design of mill tables and gearing. All of the mill and table gears are machine cut and all bearings are ring-oiled. The wobblers on the rolls, spindles and main pinions are also machined together with the coupling boxes which fit them. The horizontal mill rolls are 36 in. in diameter, and 84 in. face with 26½ in. necks. The original vertical rolls are 24 in. in diameter, but it is the plan now to equip the mill with 28-in. vertical rolls. The main pinions are 46-in. pitch diameter, 57-in. face and 27 in. diameter at the necks. The mill will roll slabs up to 60 in. wide, weighing 4 to 20 tons and at the same time it is sufficiently flexible so that it may be conveniently used for rolling forging, axle and tie plate billets as well. For this range of product a variety of ingot sizes are used, ranging from the standard Gary works ingot, 20 x 24 in. up to ingots 30 x 64 in. The maximum opening obtainable in the vertical rolls is 90 in., and the very small minimum, 12 in., made possible by the vertical staggering of the driving gears.

The mill is driven from two independent reversing steam units, steam for which is generated in waste heat boilers as indicated above. One unit drives the horizontal rolls and the other the vertical rolls. The screw-downs of the mill are motor driven with hydraulic pull-backs. The engine driving the horizontal rolls is a twin tandem compound geared reversing unit with cylinders 44 and 76 in. in diameter by 60-in. stroke. The drive for the vertical rolls presents a new combination with a high pressure and two low pressure cylinders acting as a triplex unit, the cylinders being all 44 in. in diameter by 48-in. stroke. A general view of these units is illustrated in Fig. 4. They are not now run condensing, but later it is the expectation that they will be.

Some modifications of design are incorporated in the hydraulic manipulator for this mill. The manipulator is built in, in the sub-floor space directly under the mill approach table, and consists of two similar opposed units, each comprising an hydraulic cylinder and movable fingers with connecting mechanism. By virtue of the bell crank connection between the hydraulic operating cylinders and the manipulating fingers, two motions, vertical and horizontal, are obtained, so that the

Fig. 2—Soaking Pits for the Slabbing Mill

manipulator may be used both for turning the ingot entirely over or for straightening the long pieces if desired.

A view of the soaking pits for the slabbing mill is given in Fig. 2. This installation consists of eight rows of four-hole pits 7 ft. 9 in. x 6 ft. 6 in. in cross-section and 8 ft. 6 in. deep. The covers are hydraulically operated with a lifting action to prevent dragging the cover. For re-heating the ingots, coke oven gas is used exclusively, coming into the pits at a pressure of approximately 1½ lb. An electric transfer car with an automatic dumping pot under control of an operator on the car takes the re-heated ingot from the ingot crane to the mill approach table.

This approach table has a length of 123 ft. 4 in., and the mill approach equipment also includes an auxiliary crane with an ingot cradle for handling ingots from the soaking pits to the mill. But under normal circumstances the distance is sufficiently short so that the approach is made more conveniently on the tables, the table being geared for a speed of about 385 ft. per minute. The pulpit from which the vertical rolls and manipulator are controlled is in front of the mill and the pulpit for the horizontal rolls faces the delivery side of the mill, both pulpits spanning the mill tables. The operators are protected by a vision glass 1 in. thick.

From the mill to the hydraulic shear the table length is 161 ft. 8 in., and this run of the mill is illustrated in Fig. 5. The hydraulic shear is of the same general construction as a hydraulic press, and has a shearing power of 3600 tons, equivalent to a maximum cut of 20 x 60 in. The actuating

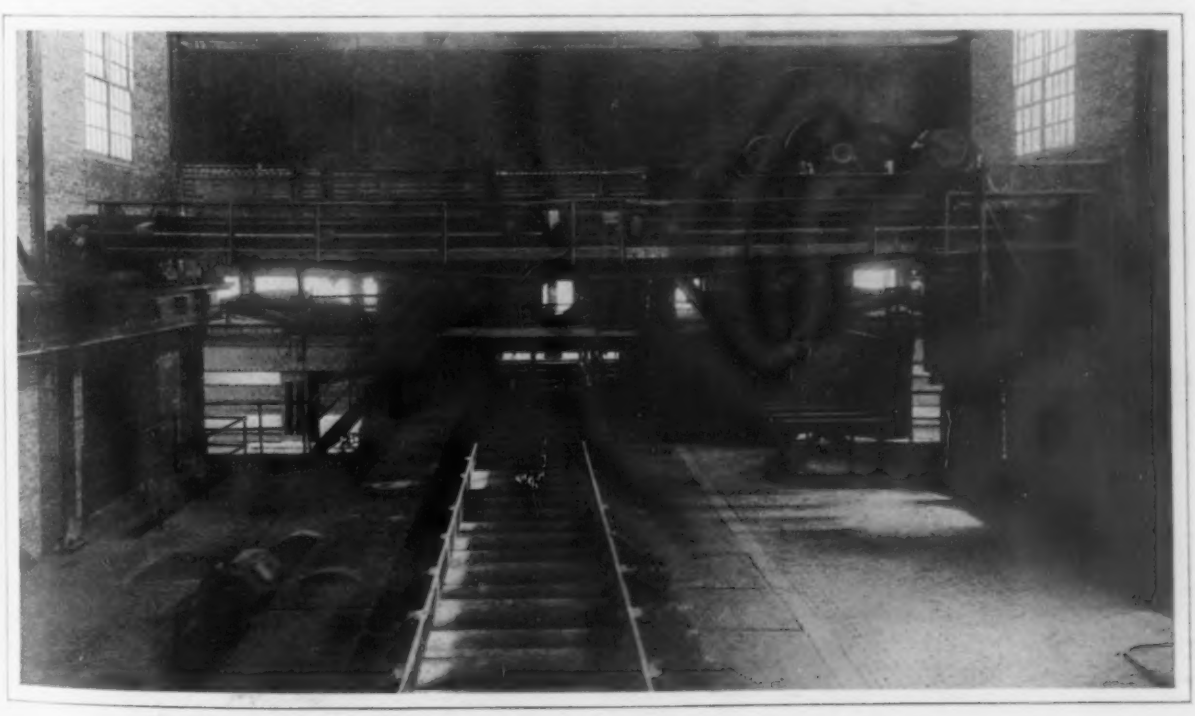


Fig. 3—The Mill Approach Table Looking Toward the Soaking Pits

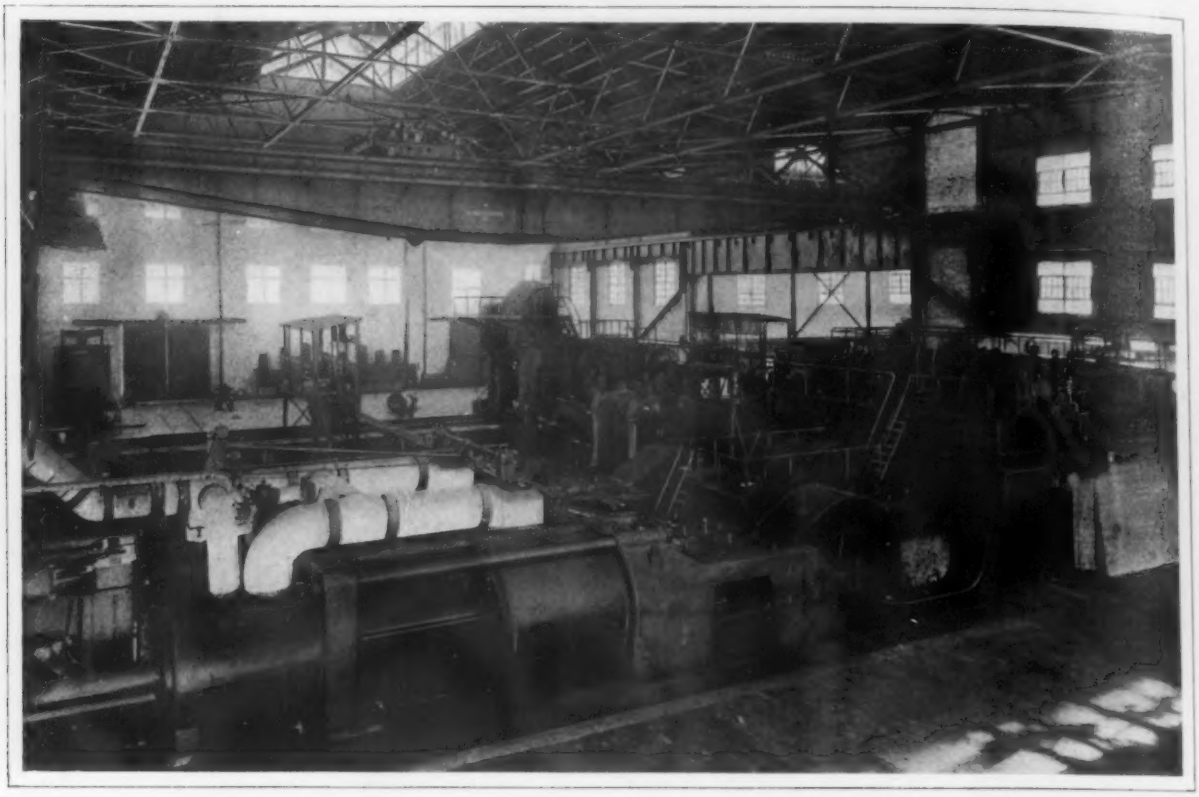


Fig. 4—The Twin Tandem Compound Engine, Driving the Horizontal Rolls in Background, Opposed to the Three-Cylinder Engine at the Right, Driving the Vertical Rolls

cylinders are arranged in tandem, the one having a capacity of 1200 tons pressure and the other 2400 tons, which pressures may be made effective separately or combined. This combination, which makes available pressures of 1200, 2400 or 3600 tons, is obtained by an arrangement of the valves controlling the admission of water to the two actuating cylinders so that the pressure can be applied to either or both as desired. The shear delivery table is arranged to tilt as the billet is being sheared, giving the needed clearance with the stroke without allowing the billet to drop suddenly.

The shear run-out table is also arranged with a set of three rolls which swing up, breaking the run of the table and allowing butts that are sheared off the billet to drop into the butt conveyor. In connection with the run-out table there is also a hydraulically controlled scale of new design, the weighing platform of which consists of arms that interlace with the table rolls. The weighing is done

Fig. 5—The Hydraulic Slab Shear

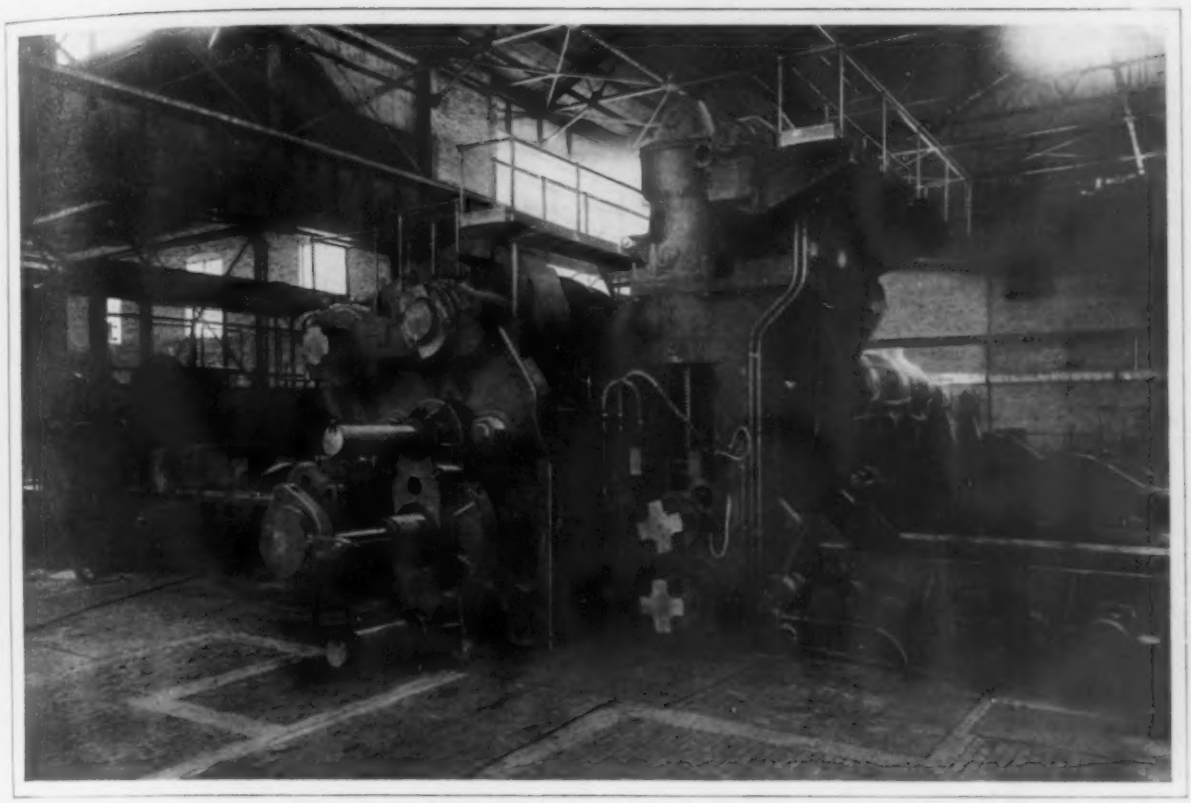


Fig. 6—At the Left the Vertical Rolls and at the Right the Horizontal Rolls, One Operating Pulpit at Extreme Left and in the Right Background the Steam Engines

with the balancing parts of the scale in suspension.

At the far end, the run-out table delivers to a slab piler, being equipped with a tilting section at that end also, which facilitates the delivery of the slabs. This slab piler is directly under the slab yard crane. When the mill is rolling billets, the product is diverted into the slab mill warehouse, where it is piled on skids for subsequent transfer in cars to the finishing mills. Ways for sliding the billets off the run-out table are provided.

The crane service in the mill includes a 60-ton Alliance crane with 113-ft. span, which serves the power plant and mill, two soaking pit cranes of 25 tons capacity, a transfer crane of 25 tons, a shear crane of 40 tons and a warehouse and a yard crane, each of 15 tons capacity. The mill tables and engine drives were built complete by the Mesta Machine Company.

The continually increasing attention which is given to safety provisions in all the mills of the

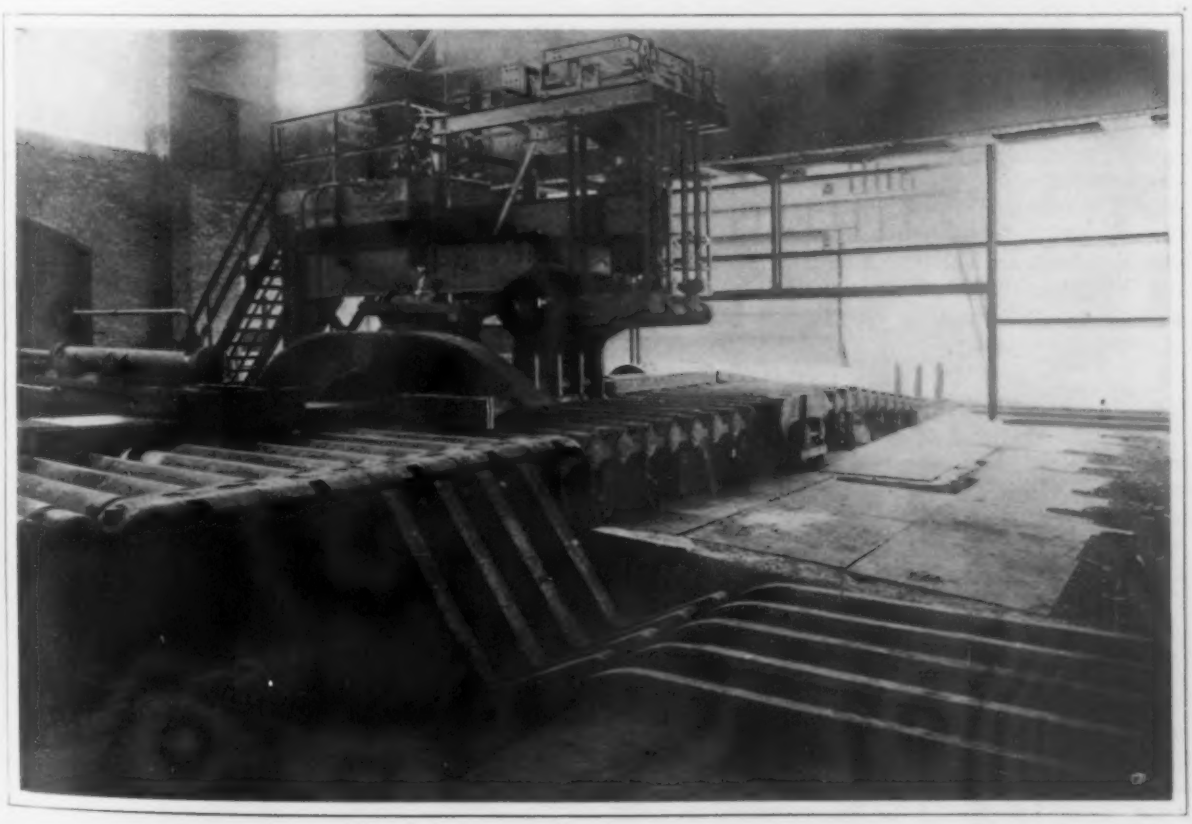


Fig. 7—The Hydraulic Slab Scale

Illinois Steel Company finds no exception here. Every place which must be reached is made safely accessible. A noteworthy adjunct of the mill is the excellent change and bath house. Steel lockers mounted on concrete pedestals which are at the same time formed to provide a comfortable seat in front of the locker are installed and there are also showers, washbowls and toilets provided under conditions calculated to make cleanliness and sanitary habits attractive.

Measurements of Modern Blast Furnaces

How These Affect the Production —An Investigation of 43 German Stacks — Oxygen Variations

A paper of great interest to blast furnacemen, both to those operating furnaces and to engineers, was published in Stahl und Eisen, May 14, 1914, by Prof. Oskar Simmersbach, of Breslau. It consists of a general discussion of furnace design based on and accompanied by details of no less than 43 blast furnaces. These 43 furnaces include nine on foundry iron, seven on hematite iron, one on Bessemer iron, nine on basic Bessemer iron, nine on iron to be used for steel making in the basic open hearth, four on spiegeleisen, two on ferromanganese and two on ferrosilicon. An outline drawing of each furnace is given showing the lines, dimensions and method of charging. Also a table with each drawing giving the percentage of each kind of ore in the burden, the analysis of each ore, its percentage of coarse and fine material, and of moisture, and the percentage of limestone used. A second table gives full details regarding the furnace and its working under 26 headings. These include the data usually given, such as the cubical contents of the furnace, daily output of iron, blast pressure and temperature, number and size of tuyeres, and coke consumption, together with much not usually found, such as the quality of the coke, the amount of slag, the time required for the charge to work through the furnace, and the analysis of the furnace gases in regard to CO and CO_2. Also the relation of many of these quantities one to the other.

Formerly the designing of a furnace was a comparatively simple matter. If the ore was easily smelted and reduced, then a wide hearth and throat were used, and the opposite with an ore difficulty reduced and smelted. With an ore easily reducible but difficult to smelt, the hearth was made narrow, and the throat left wide; and the reverse in the case of an ore difficult to reduce but easy to smelt. Today conditions are altogether different. All kinds of ores must be used in the same furnace, and in the one furnace not only one kind of iron but usually several must be made. This is made possible by the higher blast temperatures, and greater efficiency of the blowing engines.

EFFECTS OF A WIDE HEARTH

While formerly the hearth measurement depended chiefly on the kind of iron to be made (narrow for high silicon, wide for low silicon iron) it now mainly depends on the output desired. The size of the hearth influences the output chiefly in three ways. First, as the width increases so does the capacity, so that more tuyeres can be installed, and more air blown into the furnace. A direct result of this is that considerably more coke can be burned before the tuyeres and more ore smelted. The influence of the increased number of tuyeres, with the same volume of air per tuyere, is a greater pressure. The higher the pressure, the more quickly will the oxygen of the blast and the carbon of the coke unite to form carbon monoxide, also the surface of the stream of air increases with the increased number of tuyeres. The more quickly the combustion takes place the higher the hearth temperature will be, which favors direct reduction in the hearth so that silicon and manganese are reduced more rapidly, and enter the iron. For foundry iron, therefore, comparatively many but small tuyeres are recommended, and for white iron few but larger ones. With the higher hearth temperatures brought about by the high blast temperatures used today is combined a greater expansion of the gaseous products of combustion. This expansion can only take place properly with a wide hearth, so that with a wide hearth the blast takes effect more in a horizontal direction, while with a narrow hearth the expansion of the zone carrying free oxygen can only take place upward, whereby combustion, and the accompanying temperature, is spread over a greater area, which increases the coke consumption.

Second, a wide hearth brings about increased furnace output because the slag, which contains included coke and oxide of iron, can spread out more, and therefore descend more slowly. Thereby the reducing influence of the coke is granted more time. It is well known that the first slag on tapping usually shows darker in color than that which has been longer in the hearth. The work of a large diameter hearth is also of value because more metal and slag can be collected, whereby heat is better retained just as in a pig-iron mixer. There is not, therefore, the same dependence on the source of heat at the tuyeres, as in the case of a narrow hearth where the level of the tuyeres cannot be placed too high or else the metal and slag may chill more or less readily. It is therefore possible to place the tuyeres higher with a wide hearth furnace which has the result that on the one hand more material can be collected in the hearth, and on the other the tuyeres remain clearer and cleaner, so that the blast finds readier entrance to the furnace.

The third reason for the favorable influence of a wide hearth is that widening of the hearth works against the effort of the gases to rise along the furnace walls; and brings about more uniform distribution of the furnace gases through the charge, so that there results a better indirect reduction of the ore. Table 1, taken from the collected details of the 43 furnaces, shows the relation between furnace output, and distance between the tuyeres. These are measurements that would have been looked upon as almost impossible a few years ago, and are a proof that the great importance of the hearth and its dimensions on furnace output have already made considerable impression.

Table 1.—Relation Between Furnace Output and Distance Between Tuyeres

Blast furnace making	Tuyere distance			Daily output, tons	Silicon, per cent.	Manganese, per cent.
	mm.	ft.	in.			
Foundry iron....	to 3,200	10	6	160	2.5	4.5
Hematite	to 3,400	11	2	185	3.5	1.8
Open-hearth steel-making iron ..	to 3,600	11	8	350		
Basic Bessemer iron	to 4,200	13	9½	450		

After the hearth, the hight of the blast furnace is to be considered. Leaving on one side the grade of ore, which will not be considered here, it depends first of all on the quality of the coke. We find, therefore, the following hights:

Locality	Hight of charge
Silesia	19.0 to 23.5 meters
Rhine-Westphalia	25.5 to 29.5 meters
Luxemburg	24.0 to 30.0 meters

The harmful influence of the lower quality coke of Upper Silesia is here shown very clearly. In the United States furnaces have been built up to 33 meters (108 ft. 3 in.) high, but this was soon lowered to 29-30 meters, with a hight of charge of 27 meters. Practice proved that the extreme hights are unsuitable, because the coke consumption did not greatly decrease. The saving is very slight for increased hight, the nearer the coke consumption approaches the theoretical. The reason for this is that though the ascending gases give up their heat better to the charge because of increased hight, yet they do not leave the throat colder. Through the decreased temperature due to the greater hight of the furnace a decomposition of the carbon monoxide takes place, with evolution of heat, according to the equation

$$2\ CO = C + CO_2 + 39\ \text{calories.}$$

The lowering of the temperatures of the throat gases cannot therefore go beyond a certain limit which is already reached with lower furnaces. There is no object to building higher furnaces than 30 meters, especially as by doing so the cost of the plant, maintenance and operating costs increase altogether out of proportion. The blast arrangements and work of blowing become more difficult, the loss in blast greater, and also the mechanical work of charging the furnaces.

Thirty years ago the space used per ton of pig iron was as follows:

Iron	Cubic meters
Foundry iron	5.5 to 7.0
Spiegeleisen	4.5 to 5.5
Open-hearth steel-making iron	3.5 to 4.5
Basic Bessemer iron	2.5 to 3.3

Today it is the following as averaged from the collected details of the 43 furnaces:

Iron	Daily output	Cubic meters
Foundry iron	185	Only 2.89
Spiegeleisen	165	Only 2.22
Open-hearth steel-making iron	350	Only 1.34
Basic Bessemer iron	450	Only 1.28
	280	Only 1.10

Such a favorable ratio of useful furnace capacity to daily tonnage shows that the German furnaces most probably lead all the pig-iron producing countries.

In a similar way the time required for the charge to work through the furnace has decreased considerably during the last 10 years, although the percentage of iron in the charge has also decreased. For basic Bessemer iron it varies from 10 to 25 hr., the lower time for Rhine-Westphalia and the higher for the Minette district. For open-hearth steel-making iron it is from 14 to 21 hr., for hematite 15 to 30 hr., and for foundry iron 16 to 27 hr., according to the iron contents of the charge, the reducibility of the ore, and the quality of the coke. For spiegeleisen the time varies from 24 to 27 hr. For 80 per cent. ferromanganese the time required is 20 hr. with about 205 per cent. coke consumption, 18 hr. with 230 per cent., 14 hr. with 230 per cent. and 12 hr. with 260 per cent.; all for 90 tons daily output. For 12 per cent. ferrosilicon with about 125 tons daily output it is about 14 hr., with 215 per cent. coke consumption, and 12 hr. with 225 per cent.

ADVANTAGE OF A WIDE THROAT

The regulator for the descent of the charge in the furnace is the width of the throat, and the widening of the shaft. The further the charge sinks in the furnace the more it naturally spreads out in a horizontal direction, and the originally level surface takes on, more and more, a saucer-like shape. The reason is that the ore and coke do not descend evenly, the ore showing a tendency to collect in the center, and especially with fine ore, to precede the coke. This is because, first the ore has a higher specific gravity than the coke, from three to four times more, and further it is usually much finer than the coke, often being mealy and small. Spaces arise between the coke and ore that are more or less large, and the larger they are the more easy is it for the fine ore to penetrate and roll forward. This advance of the ore is further benefited by the friction of the large pieces of coke between themselves and the furnace walls. There is also considerable side pressure of the charge tending to emphasize this friction against the walls.

The result of this concentration of ore toward the center of the furnace, and coke near the walls, is that the ascending gases find much easier passage near the walls. The ore in the center column is therefore not properly pre-reduced when it enters the hearth, while at the same time there is not ore enough in the charge near the walls to exhaust the reducing capacity of the gases. Also the intense heat near the walls sinters the charge more or less, so that due to its glassy surface it also enters the hearth imperfectly reduced, and must be reduced by solid coke just like the imperfectly reduced ore from the central column. The result is a double increase in the coke consumed.

The advantage of a wide throat that favors a uniform descent of the charge has, therefore, found greater and greater recognition, so that diameters of over 5200 mm are not uncommon today, with a ratio to the diameter at the bosh line of 0.8, which makes the angle of the stack very steep. This angle is usually about 86 deg.; in particular, for furnaces making foundry iron it is 85 to 87 deg., for those making open-hearth steel-making iron, 81½ to 86½ deg., and for those making basic Bessemer iron, 81 to 86¼ deg.

EFFECTS OF BOSH DIMENSIONS

A flat bosh brings about non-uniformity of the descent of the charge to the hearth, and a steep one therefore reduces this non-uniformity and favors the working of the furnace, and an increased output. Also a short bosh reduces the tendency to hang, and brings about a quicker descent of the charge; with a higher position of the bosh line there is much more tendency toward hanging. The gases enter the bosh with great velocity due to their high temperature. If the bosh is steep then the expansion of the gases is gradual, while if it is flat they quickly cover the greater section offered. Therefore, with a steep bosh the temperature at a given hight above the hearth is greater than with a flat bosh, or to put it another way, the zone of a given temperature is greater with a steep bosh than with a flat one. This is not only of importance because of the ore, but also mainly for the coke, for the latter requires more time for preheating because of its greater specific heat. For example, the specific heat at 1000 deg. C. is 0.228 for brown iron ore, 0.257 for red hematite, and 0.4 for coke. With a flat bosh a a circle of coke readily forms at the bosh line which remains more or less unmoved for a long time, indeed it may retain its position during the furnace run.

The reason for this is that the side pressure of the charge, which is particularly noticeable at the bosh line, is not opposed by a corresponding vertical pressure. This is added to the increased frictional resistance of the flatter furnace walls. The irregular division of the ascending stream of gas which is thus brought about, with its harmful results, can only be compensated for by slower furnace running and increased coke consumption, that is lessened output and increased fuel cost. Therefore, as plainly shown by the details of the 43 furnaces, the bosh of the modern furnace becomes steeper and steeper. With large outputs the bosh angle is 76 deg., although there are some exceptions. In particular, for furnaces making foundry iron, the lowest case is 67 deg., the highest 77 deg.; for furnaces giving open-hearth steel-making iron the angle is 70½ to 77 deg., and for those making basic Bessemer iron, 71½ to 76½ deg.

Concerning the remaining furnace measurements, their relation one to the other, and their influence on the efficiency of the furnace, nothing further can be gone into at this time. It may be remarked, however, that the working out of a formula by which to calculate the lines of a blast furnace cannot be recommended. It may, perhaps, be possible for a single plant where the furnaces are all working under the same conditions, and making the same kind of iron, but such a formula would not have general value.

THE QUESTION OF THE BLAST

One matter may, however, be briefly pointed out that deserves more attention than it has so far received, and that is the blast question. If the cross-section of the tuyeres per ton of coke is compared for our modern blast furnaces, very considerable differences are found, and this is also true of the blast pressure. No settled ratio between these quantities can be noticed. For instance, the results of the 43 furnaces give the following:

Iron	Tuyere section per ton coke	Pressure
Foundry iron	3.84 to 13.3 sq. cm.	14 to 24 cm.
Open-hearth steel-making iron	5.8 to 12.6 sq. cm.	22.5 to 75 cm.
Basic Bessemer iron	3.6 to 9.32 sq. cm.	24.0 to 68 cm.

The amount of blast used for the combustion of a ton of coke therefore varies to a very great degree. It need not be emphasized here how harmful an improperly measured amount of blast may be on the working of a furnace under certain conditions, but detailed observations along this line are much to be desired.

In connection with the blast question special consideration should be given to the increase in volume of air with rise in temperature. Two tables are given in the original paper for a constant blast of 600 cu. m. per minute with 6 to 12 tuyeres. In the first table the amounts of blast that have to be furnished and the tuyere openings with increasing temperatures to give uniform pressure are given; and in the second table, the changing amounts and pressures at increasing temperatures with uniform size of tuyeres. Further, it might be specially emphasized that it is not enough to assume the volume of air sucked into the blowing engines as a proper measure for the running of a furnace, one should consider the weight of oxygen furnished, for it is this alone that enters into combustion with the coke in the hearth.

Table 2 shows that 600 cu. m. of air at 30 deg. C. correspond to 524 cu. m. at —5 deg. C. with 147 kg. or 103 cu. m. of oxygen and that 600 cu. m. air at —5 deg. C. correspond to 676 cu. m. at 30 deg. C. with 160 kg. or 116 cu. m. oxygen. A difference of 13 per cent. in oxygen-content which naturally would greatly influence the working of the furnace.

Table 2.—Oxygen Content of 1 Cubic Meter of Air at Various Temperatures

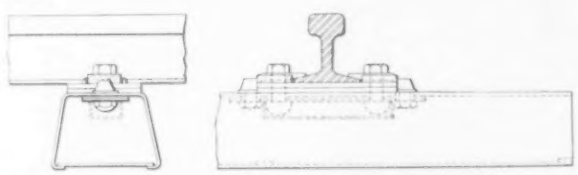
Deg. C.	Air, kg.	Of this oxygen equals Kg.	Cu. m.
30	1.1648	0.24460	0.17100
25	1.1844	0.24872	0.17388
20	1.2046	0.25296	0.17684
15	1.2256	0.25737	0.17992
10	1.2473	0.26193	0.18311
5	1.2698	0.26665	0.18641
0	1.2931	0.27155	0.18984
— 5	1.3172	0.27661	0.19337
—10	1.3423	0.28188	0.19708
—15	1.3684	0.28736	0.20089

The non-consideration of this point explains why in the first American experiments with dry blast the unexplainably great coke saving and high outputs were obtained. The amounts of blast in the comparative tests with dry blast and ordinary air were indeed the same, but not the amounts of oxygen. This shows the necessity of blowing by the thermometer; that is, paying attention to the temperature of the air entering the cylinders of the blowing engines.

So much is still unexplained regarding blast furnace operations that everything should be considered that may increase uniformity. The conditions and relations of the blast appear to stand in the first place in this respect, and it does not seem a mistaken view that a method is hereby indicated by which many plants could improve their practice and lower their operating costs. G. B. W.

A Simple Design of Steel Railroad Tie

The National Steel Tie Company, Harrisburg, Pa., has developed an interesting type of steel tie for use on steam and electric railroads as a substitute for wooden ties. It may be made of rolled steel.



End and Side Elevations of a New Steel Tie for Use on Railroads in Which the Interior Is Filled with Concrete

The tie, which is 100 in. long, has the outline in cross-section of a trapezoid, the top of the tie measuring 6 in. across, while the base is 3 in. wider. The depth of the tie is 6 in. An outer steel shell of 5/16-in. plate that can be rolled or pressed at the mill at a single operation forms the body of the tie proper, which can be filled with concrete, asphalt, or any other substance, as may be desired. The rail is carried by a tie plate resting on the tie and designed to take up the thrust of the rail, to prevent rail spreading. Wear in the rail can be taken up by simply turning the tie plates around. The rail is fastened to the tie by clips held in place by bolts engaging with an insulated plate within the tie. The clips fit snugly in recesses provided in the tie plate, which are relied upon to keep them from turning. The grip on the rail and the number of the clips per rail length as well as the weight of the tie are relied upon to prevent creeping of the track.

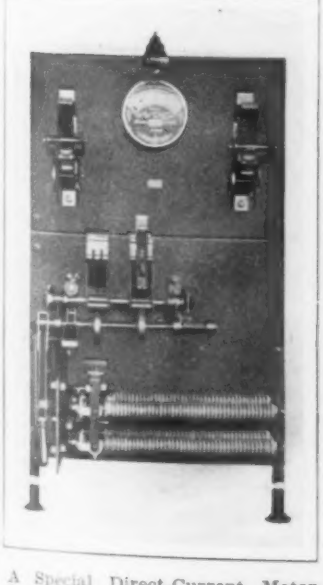
An installation of 203 ties of an earlier design has been in service on one of the main tracks of the Pennsylvania lines west of Pittsburgh for about 10 months. The traffic at this point consists of approximately 100 passenger trains, both local and express, as well as a number of heavy freight trains, some of which travel at high speeds. Although the ties are on a 2-deg. curve, it is stated that the condition of the ties and track is the same as when the former were installed.

Compression Starters for Large Motors

Two types of starters for use with motors of larger sizes than has heretofore been the case have been developed by the Allen-Bradley Company, Milwaukee, Wis. The two starters embody the principle of the compression of the series of graphite disks to vary the resistance in the circuit. One of the units is designed for use in connection with direct-current motors ranging from 150 to 300 hp., while the other is intended for use with alternating-current motors up to a maximum of 100 hp. and contains no-voltage and overload protective devices.

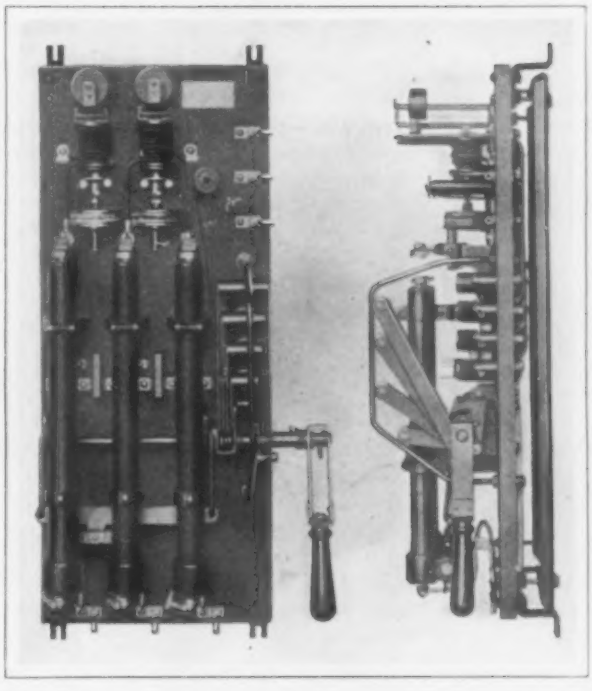
The direct-current unit has only one operating lever which reduces the number of operating parts required with a multiple-switch starter. The movement of this starting lever successively actuates two clapper switches by a cam arrangement. One of the switches closes the motor circuit, while the other cuts the resistance units out of the circuit after they have been completely compressed. Auxiliary graphite arcing contacts are provided for the first switch and an automatic no-voltage release is furnished with the operating magnet connected in series with the shunt motor field. If desired, an overload release mechanism can be furnished and the standard motor starting panels can be supplied with field rheostats to increase the speed of the motor. In this case the no-voltage release is omitted and an arrangement of relays substituted which short-circuits the field rheostat during the starting period. Special panels with knife switches, voltmeters, ammeters, circuit breakers and other apparatus mounted upon them, together with the motor starter, can be furnished.

With the alternating-current starter, it is pointed out that it is unnecessary to furnish a line switch, as the motor is completely disconnected from the line when the mechanism is in the off position. As the operating lever is raised contact is made between the resistance units and the line, thus closing the circuit to the motor. Further motion of the lever admits sufficient current to enable the motor to start and subsequently bring it up to full speed. When the running position of the lever is reached the operating mechanism is caught by a latch and held in position, while the lever can be returned to the starting position if desired. This arrangement enables the motor to be stopped by pushing the lever a few inches in the opposite direction to that used for starting, which has the effect of releasing the latch. It is emphasized that in the starting position the running fuses are shunted out of the circuit and can therefore be of sufficient capacity to give the motor effective protection.



A Special Direct-Current Motor Starting Panel with an Ammeter and Two Circuit Breakers Mounted on It

The protective devices furnished with this starter include two adjustable relays with time limits to protect the motor against overloads. The use of the time limits is to give the motor protection against an overload and at the same time prevent the stopping of the motor due to fluctuations in the line voltage or other causes. To prevent the motor from running single phase as a result of the interruption of any phase of the supply circuit and to provide no-voltage protection in all phases, reliance is placed upon a no-current tripping device.



A Carbon Compression Type Resistance Starter for Induction Motors Up to 100 Hp. Equipped with No-Voltage Release for All Phases and Time Limit Overload Relays

Evening School of Engineering at Pittsburgh

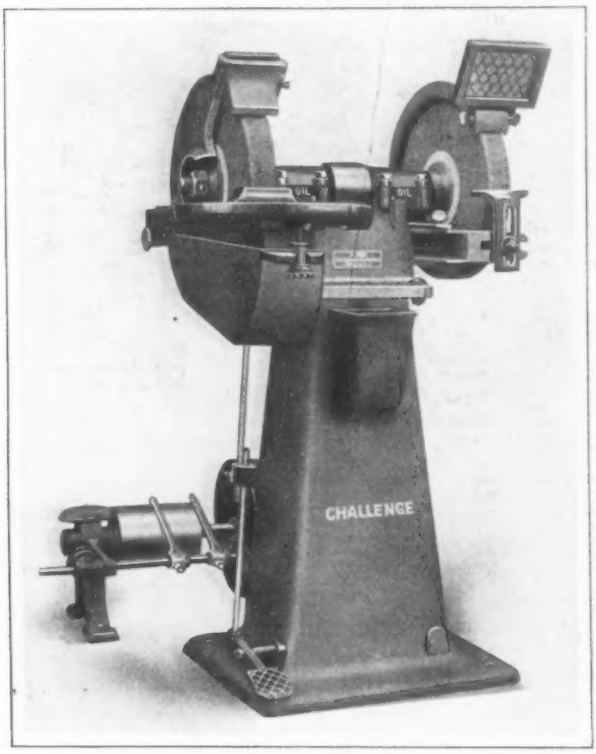
An evening school of engineering, giving the graduate courses, will be a new feature introduced into the University of Pittsburgh this autumn by Dean F. L. Bishop. It is the first time this kind of work has been attempted in this country, although several day schools offer graduate work. Harvard established a graduate school five years ago, but it was not successful because men could not afford to take time from their engineering work to attend these advanced courses. In the Pittsburgh district there are said to be more engineering graduates than in any equal district in the United States. It is for this reason that the University of Pittsburgh will provide for men who do engineering work during the day an opportunity to study engineering in the evening. Men who are properly prepared and who have received their bachelor of science degree may obtain an engineering degree.

Courses will be offered in the valuation of public utilities and in mechanical, civil, electrical, sanitary engineering, etc. The faculty will include some of the best engineers in the Pittsburgh district. Paul M. Lincoln, professor of electrical engineering, University of Pittsburgh, president of the American Institute of Electrical Engineers, and consulting engineer of the Westinghouse Electric & Mfg. Company, will give a course in power plants. Prof. R. T. Stewart, head of the department of mechanical engineering, University of Pittsburgh, and consulting engineer of the National Tube Company, will offer a course. Prof. J. Hammond Smith, head of the department of civil engineering, will give courses in structural engineering. Prof. Morris Knowles, director of the department of sanitary engineering, together with Prof. G. W. Case and William S. Morehead, will give the course in the valuation of public utilities.

Wheelock, Lovejoy & Co. have removed their New England office and warehouse to 128-138 Sidney street, Cambridge, Mass. The postoffice address is box 5081, Boston.

Grinding Machine with Protected Wheel

A combination machine arranged for both wet and dry grinding and having an adjustable eye shield and wheel guard has been developed by the Challenge Machine Company, Inc., 5116 Springfield



A Combination Wet and Dry Grinding Machine Equipped with a Wheel Guard That Can Be Adjusted to Compensate for Wear

avenue, Philadelphia, Pa. This machine is designed to enable either class of work to be handled by a single machine. This arrangement, it is pointed out, possesses the advantages of economy in cost, floor space, power and the workmen's time. The machine can be driven by a belt from a ceiling or floor countershaft or even from a shaft on the ceiling of the floor below, or an electric motor, as may be desired.

The wheel guard employed with the machine is made of a heavy steel channel, which is forged to shape to secure a rigid guard not subject to breakage. The space underneath the wheel has been left open and the upper member can be readily removed, if it is desired, to grind on top of the wheel. Vertical and horizontal adjustments are provided to keep the guard close to the wheel, irrespective of the wear. The guard is attached to the machine by a horizontal steel channel, having two bolts passing through a slot. This is to allow adjustment of the guard forward or backward with relation to the center of the machine. The rear end of this horizontal member is bent at right angles and has another slot in which the bolt holding the upper member in position passes. This bolt can be moved horizontally in this slot or vertically in the slot in the upper member to give any desired adjustment. This arrangement is similar to that shown for the adjustable work rest at the front which is fastened in the same way as the wheel guard. The eye shield, which is ordinarily furnished with clear wire glass, is detachable, and if desired, leather or other material can be substituted. Thumb screws on either side provide for the adjustment of the shield.

The water required for the wet grinding is supplied by a foot treadle, which when depressed raises the front end of the water pan, the amount of water poured upon the tool varying from a spray to a sluice, according to the amount of pressure employed. The water returns to the pan through the open bottom of the apron, the lower portion of which extends into the water pan. A hand nut serves to limit the rise and fall of the front end of the water pan and is employed as the water diminishes by evaporation sufficiently to make it necessary. When it is desired to clean the pan, it is simply necessary to remove the hinge rod indicated by a knob at the rear of the pan, which can then be removed and emptied of the grindings. This arrangement, it is emphasized, does away with pipes or draw-off cocks which might become clogged or leaky hand holes, and as the pan forms a distinct unit it can be removed and a plain wheel substituted if desired.

Cold Rolled Steel Plate Sheet Piling

For use where it is not desirable to use its heavy steel sheet piling, which was illustrated in *The Iron Age*, June 20, 1912, the Lackawanna Steel Company, Lackawanna, N. Y., has developed a plate type. This is cold rolled from a steel plate and is intended particularly where the piling need not be driven in very long lengths or in dense material with hard penetration. It is designed also for general use in installations where a permanent impermeable wall of light weight is required to prevent the passage of water, such as cut-off walls under masonry foundations constructed in saturated soils and for core walls in earth dams and embankments.

The piling comes from a mill that is especially designed for its manufacture and is rolled from metal 3/16 in. in thickness. The sections measure 8 in. between joint centers, and the arched web, which is relied upon to give columnar and transverse stiffness, makes a wall 2 9/16 in. from the outer face of web of one section to that of the adjacent one. The form of interlock used, it is pointed out, while simple to give free driving, at the same time possesses

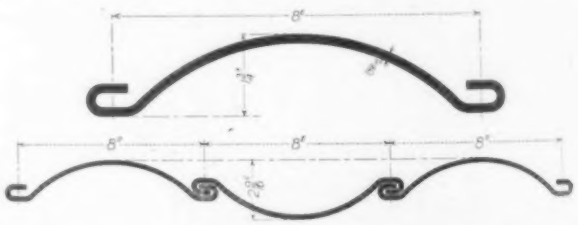


Diagram Showing the Construction and Method of Using a New Type of Sheet Piling That Is Cold Rolled from Steel Plates

sufficient resistance against the passage of water through the joints. The weight of the piling is 11.5 lb. per sq. ft. of wall and 7.6 lb. per lin. ft. of piling section.

Additional British Contraband of War

A supplement to the London Gazette has been published containing a proclamation specifying certain articles which are to be treated by the British Government as conditional contraband of war. The principal clause in the proclamation reads as follows:

"Now, therefore, we do hereby declare, by and with the advice of our Privy Council, that during the continuance of the war, or until we do give further public notice, the articles enumerated in the schedule hereto will, notwithstanding anything contained in article 28 of the Declaration of London, be treated as conditional contraband." The schedule names the following: Copper, unwrought; lead, pig, sheet, or pipe; ferrochrome; hematite iron ore; magnetic iron ore; rubber.

Lea-Courtenay Company Increases Facilities

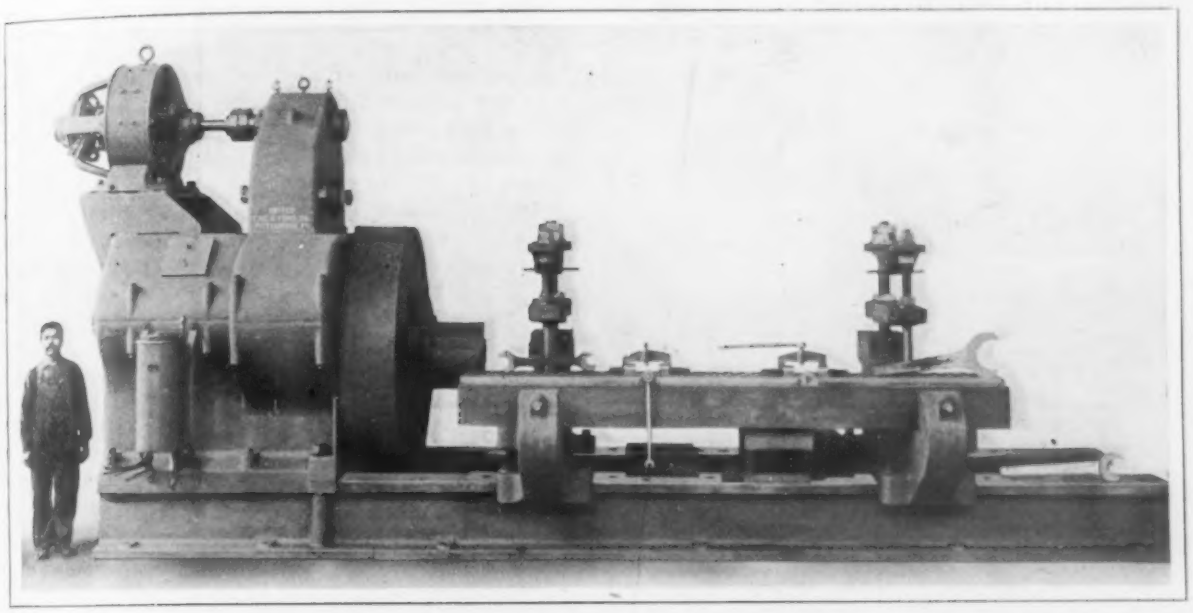
The Lea-Courtenay Company, a New York corporation, has been reincorporated in New Jersey as the Lea-Courtenay Company and its capital stock increased from $50,000 to $150,000. It was necessary to increase the capital stock in order to take over property owned by E. W. Heller, treasurer of the company, consisting of machine tools, buildings, etc., formerly used by the Alexander Traud Company, 5 Main street, Newark. The new company, in addition to manufacturing turbine pumping machinery and metal cutting saws, has taken over the Cotton furnace department of the Alexander Traud Company, which manufactured automatic stokers, and installed furnaces for burning low grade fuel. The company has discontinued the foundry of the Traud plant and has turned the building into a testing plant and erecting shop for its turbine pumping machinery. A 500-hp. marine boiler, a 500-hp. Terry steam turbine, arranged to run at variable speed, and various torsion dynamometers, etc., for testing large turbine pumping machinery have been installed. The company builds turbine pumps from 3 in. to 24 in. An office has been opened in Montreal in charge of W. R. Matthews, which will look after the stoker business in Eastern Canada.

The machine shop, which is equipped with new machinery to turn out the products of the company, has been entirely reorganized with Walter Knapp as works manager, who was formerly with the Bethlehem Steel Company. W. C. Dowd, formerly of the Camden Iron Works, who has been acting as assistant mechanical engineer, has been made chief engineer. Alfred Cotton is chief engineer of the stoker department. The officers of the new company are the same as formerly, namely: Albert G. Lea, president; Edgar W. Heller, Newark, treasurer, and C. R. Rothwell, secretary. The main sales office will remain at 90 West street, New York.

Edison Day, the thirty-fifth anniversary of the day Thomas A. Edison first made a successful electric filament incandescent lamp, will be celebrated October 21. After two years of effort, in which the metal filaments, now universally adopted, were cast aside as impracticable, the bamboo filament was found to fill the purpose. This achievement will be commemorated on that day by the launching of a country-wide propaganda of lamp manufacturers and electric lighting companies to educate the public to the value and usefulness of the Mazda lamp. Local campaigns now under way will be brought to a climax at that time and the cars of many street railways will be stopped at noon as a tribute to the inventor.

A Heavy Duty Lathe for Turning Rolls

The United Engineering & Foundry Company, Pittsburgh, Pa., has brought out a heavy duty roll turning lathe that can be supplied with either belt or motor drive. One of the features of the lathe is that two rolls can be machined simultaneously, rough turning being performed on one and another finished, which it is pointed out was impossible on the type formerly built. On account of the character of the work required, the construction is made heavy with a view to providing power and at the same time eliminating vibration and chatter.



A New Design of Heavy Duty Roll Turning Lathe in Which It Is Possible To Rough Turn One Roll and Finish Another Simultaneously

The bed plates are massive castings, both sides of the bed being of box section, which is relied upon to give stiffness. The bearings and the wearing parts are made of large size, with a view to reducing the cost of up-keep. The headstocks are of the inclosed type and are made oil tight, the design, however, being such that any of the shafts with the gears can be readily taken out. All of the gears are of steel with cut teeth and run in an oil bath, which is relied upon to prolong the life of the gears and also reduce noise and vibration. The internal gear of the faceplate and its pinion have cut teeth and a shield into which grease may be packed for lubrication. Removable babbitt shells are used to bush the shaft bearings and are flooded with oil by a splash lubricating system. The housings, piano rests, tailstock and necking rests are all of heavy construction, in keeping with that of the bed and the headstock.

The driving motor, which is furnished with a speed range of 4 to 1 or 8 to 1, is mounted directly on top of the headstock, which by reason of its inclosed construction provides a rigid support. The motors have large gears, bearings and general massive construction, which is relied upon to provide for the heavy duty required of lathes of this character in modern roll turning practice. A feature upon which emphasis is laid is that the mounting of the motor on top of the headstock does not interfere with ready access to the interior.

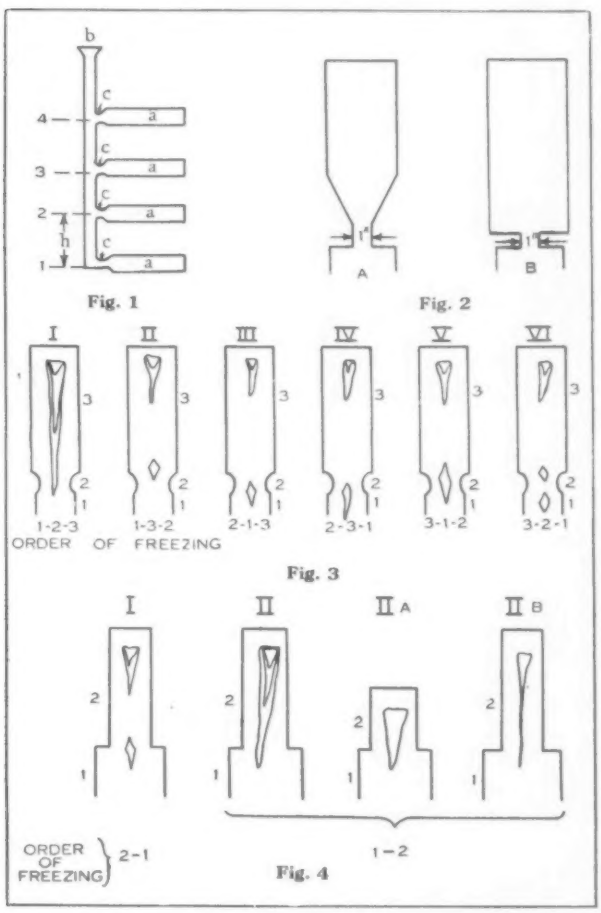
These lathes, which are built with swings of 18, 26, 34, 42 and 50 in., are furnished with several types of housings for handling various classes of rolls and can also be equipped with top bearings for matching or crossing rolls, if so desired.

Preventing Piping in Steel Castings*

Minimizing Metal Lost in Sink-Heads, Gates and Runners—Use of Chills—Cores for Necks of Sink-Heads

BY JOHN HOWE HALL

We can cause certain parts of a casting to cool ahead of the other portions by making the walls of the mold of metal, at the points where we wish the cooling to be rapid. By the use of chills we can cause certain portions, generally the lower portions, of the casting to freeze before the upper parts, and thus assist the top to remain molten after the bottom has frozen.



Diagrams to Illustrate the Proportions of Runners and Sink-Head Necks and the Formation of Piping in Castings

There is still a further practical application of the method of decreasing the depth of the pipe which is utilized in ingot practice. This is, to strip the ingots while their interior is still molten and charge them on end in the soaking pits, where their final solidification takes place slowly. In some cases it might be possible to accomplish a similar result by shaking out a casting before it is entirely solidified and charging it into a hot furnace where it is kept on end and allowed to complete its solidification slowly. The heads and possibly a portion of the heavy upper parts of such a casting might be kept hot by removing the mold from around them and surrounding them with a brick-lined stove that could be put in position quickly and kept hot by means of oil burners or a coal fire. This method, indeed, is used to a certain extent when we heat the top of a sink-head with oil burners or a charcoal fire. Another way of accomplishing the same result is to use thermit in the heads in order to warm them up by the heat of the thermit reaction.

Our molds are commonly filled from the bottom, so that the metal which finally forms the top of the casting is that which first entered the mold and is the coldest. True, it is quite common to stop pouring through the gate when the metal reaches the sink-heads, and pour the latter from the top, and this practice is theoretically correct. But in some cases this is not sufficient, as the cooling of the upper part of a tall casting may outrun that of the bottom portions, poured last, to such an extent as to make it impossible for the feeding of the sink-heads to be effective. We may easily imagine a case where the top metal is so cold when pouring stops that it freezes completely, forming only its own small pipe. The sink-head will feed this; but the later-freezing lower portions will form their own contradiction-cavity, which is completely bridged off from the sink-head by the frozen upper portions.

TOP POURING BY SECTIONS

This condition may often be met by arranging a series of gates at several levels, so that as soon as the mold and runner are filled up to the level of gate two (counting from the bottom) the metal will enter the mold through this gate and run in over that already in the mold. When the steel reaches the level of gate three, the process will be repeated. The sink-head proper feeds the last section poured.

There are certain disadvantages of this method. The first is that any loose sand from the mold may be trapped in the casting when the metal begins to flow in through the upper gates. The second is the danger of filling the runner too quickly, so that metal will flow through the second gate before the metal in the casting has reached that level, and cut out the mold as it flows down its walls.

In certain cases where the vertical hight of the casting is small, compared to that of the runner, and no separate sink-head is used, the runner itself may be considered as the sink-head. In this case, the action of properly placed chills may cause the feeding of the casting by the metal being run in to proceed so far that the metal in the runner will complete the work after pouring ceases and make a perfectly sound casting. The neighborhood of the gate must not be chilled. It is also essential that the first metal be run in rapidly and the pouring completed slowly.

PROPORTIONING AND PLACING GATES AND RUNNERS

The cross-section of the gate or gates should be equal to that of the runner—in most cases there will be no object in making it greater. Should there be a number of gates, however, whose total cross-section is equal to that of the runner, they may be individually so small as to be in danger of freezing. In this event, their total cross-section may be made greater than that of the runner.

A high mold requires larger gates and runners

*From a comprehensive paper presented to the American Foundrymen's Association and covering also the defects in steel castings due to cracks and blow holes both internal and external. The author is a consulting engineer, New York City.

than a low mold of the same cross-section, resulting in a greater loss of metal scrapped as sprues per pound of casting in the case of the high mold. Take, for example, a single casting 10 in. in diameter and 6 ft. high, requiring say a 3-in. runner, and three castings each 10 in. in diameter and 2 ft. high, each requiring only a 2-in. runner, as shown in Fig. 4. We see that the weight of the three castings each 2 ft. high equals that of the single casting 6 ft. high. But the weight of the single 3-in. runner is greater than that of the three 2-in. runners in the ratio of 2.25 to 1. We scrap, therefore, about twice as much metal per pound of casting in making the single high casting as we do in casting the three low ones.

This brings us to the second advantage of the use of several gates at different levels in pouring a high casting. If we use one runner and three gates 2 ft. apart vertically, in pouring the single 6-ft. casting, we can make the runner only 2 in. in diameter with perfect safety, for the lowest gate then is required to feed the metal only so fast that it will flow freely until the second gate is reached; whereupon, the pouring practically takes a fresh start on the second section of the casting, the metal flowing in through the second gate. Thus in addition to improving the feeding by giving us partial top-pouring, the use of several gates leads to an actual saving of metal scrapped as sprues per pound of casting.

A similar saving in weight of sprue scrap is not effected by multiple pouring of small castings, by which a number of flasks are stacked on top of each other and poured through a common runner. Thus, if *a-a*, Fig. 1, be a series of small castings, poured through a common runner, *b*, by means of gates *c*, we see that the pouring of the lowest casting and of the lowest section of the runner, from level 1 up to level 2, is in no way affected by the fact that there is additional runner extending above level 2. The size of runner and gate necessary to pour the lowest casting is exactly the same as if this casting were being poured alone. The runner then fills up to level 2, and the second casting is filled just as if there were no others either below or above it. No reduction in size of runner can be made on the score of reduced friction of cold metal rising in the mold.

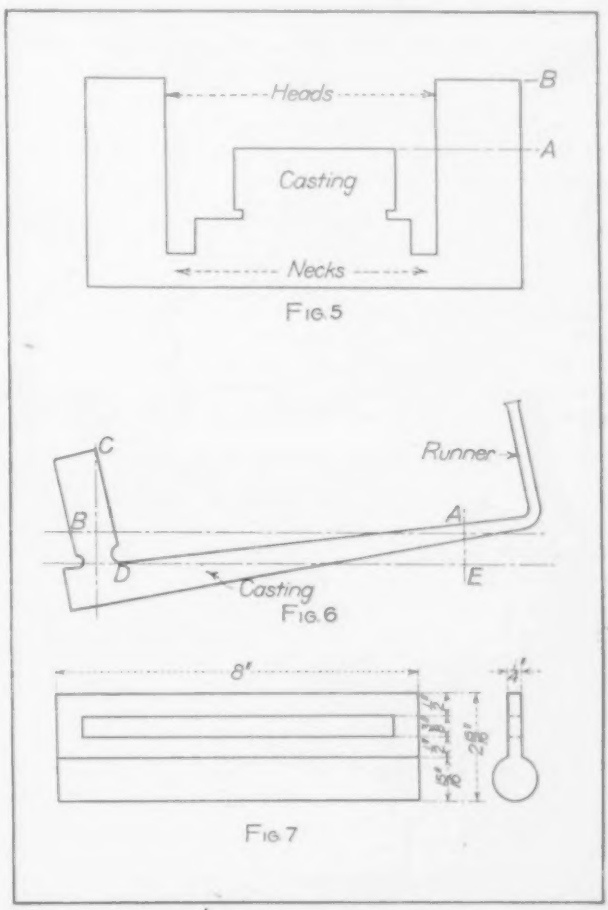
There are, however, reasons why multiple pouring effects a saving in runner scrap. When the castings are poured singly, the runner has to be so thick and high that it will stay molten long enough to provide the necessary metal to feed the casting. With a common runner for several castings at different levels, the metal in each section of the runner helps to feed the section below, both during and after the pouring of the lower section.

WIDTH OF HEAD AND NECK

The head must be at least as large, generally larger, than the section of casting it is to feed. The rate of cooling of a neck of a given diameter is greatly influenced by its length and by the shape of the head. Thus a long neck, tapering upward to the full size of the head, *A*, Fig. 2, will cool much more rapidly than a short one of the same thickness, as shown at *B* in Fig. 2, because in the latter the short neck is kept hot by the closely adjacent mass of metal in the head and casting. The neck should, therefore, be made as short and be joined to the head as squarely as it is possible to mold it.

Theoretically, given a section of casting to be fed, a sink-head, and a neck connecting them, there are six different orders in which the three may freeze. These are represented diagrammatically in Fig. 3, numbered cases I to VI, with the order of freezing indicated and the shape and location that the cavities may be expected to assume sketched in. Of these, cases II, V and VI are of little interest, as they all involve the freezing of the head before that of the neck; a condition that will seldom be found to occur in practice, at least under ordinary circumstances.

In practice, cases I, III and IV will occur. Case I may involve a head, neck and casting all piped, as indicated by the deepest pipe shown in the sketch. In that event, there was obviously not enough metal in the head to feed the casting. The remedy depends upon the thickness of the shell of the frozen head and neck. If it is very thick, and if the pipe is but a very narrow hole, it is plain that if we secure more metal by increasing only the hight of the head, the head and neck will freeze tight before this extra metal can reach the casting, and the situation



Diagrams Illustrating Location of Sink-Heads and the Test-Bar for Ascertaining Shrinkage Stresses

will be that shown in case III. We need, therefore, a wider head and neck, and perhaps a higher head also.

If the walls are very thin, showing that the metal ran out much faster than it froze, increase of the hight of the head, and a slight increase of the diameter, are called for. This case, however, may also indicate that if we had kept the ladle over the head a little longer and fed the shrinkage by slow pouring at the last, we should have come out all right with the head and neck we had.

On the other hand, if the casting and neck are sound, and the pipe in the head comparatively shallow, we have overdone the matter and wasted metal in the head. The latter may be reduced in hight and probably also in diameter, until we find it is piped nearly to the bottom, as shown in the intermediate positions of the pipe in the sketch.

Cases III and IV are those in which the neck

froze first. The remedy is first and foremost a wider and if possible shorter neck.

It will be seen from the above discussion that to make the necks small, in order that the heads may be knocked off by means of a sledge hammer or drop ball or burned off at the least expense, is dangerous practice because it may well lead to premature freezing of the neck. By molding the neck in a special core it can be made very short, so that although considerably narrower in at least one dimension than the head, it will feed very efficiently. The core is so thin and the neck consequently so short, in this method of molding, that the mass of hot metal in head and casting quickly brings the core to a high temperature and thus keeps the neck fluid.

When the head is the same size all the way down and no neck is used, there are but two orders in which freezing may occur—head first, or casting first. These cases, and the probable shape of the resulting pipe, are shown in Fig. 4. When the head freezes first, it will form its own pipe; the casting will then freeze and the pipe formed in it will probably run up a little way into the head (case I). When the casting freezes first, it may be sound (case II). Then if the pipe in the head reaches down only a little way, the head has been made too high and perhaps too wide. If the pipe in the head goes quite deep but does not reach the casting, the size of the head is theoretically correct. Should the pipe reach into the casting, it may be very wide, so that the walls of the head are thin (case II-A); this calls for a higher, and perhaps a somewhat wider head. If the walls of the head are very thick and the bottom part of the pipe a small hole, greater diameter of head is the obvious remedy (case II-B).

HEADS FEED MOST EFFICIENTLY DOWNWARD

When a considerable extent of horizontal surface is to be provided with heads, especially if the vertical dimensions of the castings are small, a number of heads must be used and they must be placed so close together that their effects overlap. Such a casting will be more efficiently fed by a number of comparatively small heads placed close together than by a few heavy heads. Of course only the hight of the heads is useful in providing the pressure required to force the metal to flow sidewise to the distant portions of an opening, so that the total weight of the heads has nothing to do with their effectiveness in feeding far in a horizontal direction. Short, thick heads, therefore, will feed only a limited area near their bases, frequently an area that cannot use all the metal they contain.

The effective pressure exerted upon the neck of the casting shown in Fig. 5 by the metal in the heads is proportional only to the difference in level *A-B* between the metal in the head and that in the casting, so that after pouring is stopped only the portion *A-B* of the head is effective in producing pressure on the metal in the neck to make the latter flow. Increased diameter of head will not increase this pressure in the slightest—though by keeping the metal hot longer, it prolongs the period during which the pressure is exerted. Increased hight of head, on the other hand, greatly increases the pressure.

Moreover, the heads, so attached, have to do their work by bringing pressure to bear on the still liquid metal in the casting, by which that metal is made to flow upward and close the pipe. The heads must fail to be effective as soon as the metal in the casting becomes too sticky to flow.

TIPPING UP SHALLOW CASTINGS

Thin castings, especially long, narrow, shallow sections, are frequently tipped up at the gate end for pouring. In some cases such a casting can be made sound by the action of chills placed upon the lower end, without the use of sink-heads. In case the effect of the chills will not suffice to make the casting sound, heads are necessary. These are frequently placed toward the lower end of the casting, especially if that end is the heavier. So located, the heads are not in a position to feed as efficiently as they should. In Fig. 6, for instance, we see that if the runner will suffice to feed the casting as far along as *A*, then the rest of the metal in the casting, from *A* to *D*, will tend to run downward toward *D*, and will exert a fluid pressure proportional to *A-E*, the difference in level between *A* and *D*. The portion of the head *B-D*, equal to *A-E*, is useful only to balance this pressure, and only the portion of the head *B-C* exerts pressure upon the metal in the casting. Moreover, the conditions are much like those in the case of the side-attached head—we are trying to make the head close a pipe which will form in the upper portion of the casting, between *A* and *D*, by forcing the metal below the flow back against gravity and close a distant opening. A second head between *D* and *A* might or might not be so located as to be just over the place where the pipe tends to form, since the position of this pipe will vary from casting to casting, depending upon the temperature of the metal when poured, how fast it is poured, etc. If for any reason it is essential to place the head on such a casting at the lower end, the head should be made as high as possible and should be poured separately with hot metal from a second ladle.

CRACKS IN CASTINGS

Cracks in castings are due primarily to the shrinkage of the steel in cooling from the temperature of solidification to that of their surroundings. The shrinkage of ordinary carbon steel amounts to about ¼ in. per foot, being somewhat less as the carbon approaches 0.90 per cent., and greater the lower the carbon. Could all parts of the casting cool at the same rate, shrinkage would not make trouble. But when a light portion cools ahead of a heavy one, the resultant shrinkage of the light section often brings a heavy pull on the heavy one when the latter is still hot and weak, resulting in the tearing apart of the two at the weakest place—which is not necessarily the smallest section, but that which is weakest at the temperature existing when the stress is set up. Should the casting hold together, the later shrinkage of the heavy portion after the light part has become cold and rigid often sets up heavy compression stresses in the latter. Thus in the shrinkage stress test bar show in Fig. 7, the light section cools first, the hotter heavy part yielding to the pressure. Then when the heavy portion begins to cool faster than the light part, the latter is compressed very strongly, so much so that if it is cut in two with a hack saw when cold, the moving together of the sides of the cut can be measured very easily. The magnitude of the stress set up is very great—so great that a blow with a hand hammer on the heavy part, and not a very heavy blow at that, suffices to snap the connecting leg between the light and heavy portions as if it were a pipe stem.

The Board of Trade, London, announces that the contraction of employment in England has been made by reduction of hours instead of a reduction of forces. Ninety-three per cent. of the employees are still at work all or part time. Of the reduction of 7 per cent. in the number employed at least two-thirds is caused by the leaving of men for military service. The cotton and vehicle industries are the two most affected.

RAIL FINISHING TEMPERATURES

Their Influence on the Properties of American Rail Mill Product

"Observations on Finishing Temperatures and Properties of Rails" is the title of a 63-page pamphlet, No. 38 of the Technologic Papers of the Bureau of Standards, Washington, D. C. A résumé of the paper is to be presented for discussion at the coming Pittsburgh meeting of the American Iron and Steel Institute. The investigations were carried on by G. K. Burgess, physicist of the Bureau of Standards J. J. Crowe and H. S. Rawdon, assistant physicists, and R. G. Waltenberg, laboratory assistant. The measurements of ingot and finishing temperatures on which the conclusions now put forth are based were made in the spring of 1913 at four representative rail mills designated in the report as A, B, C and D. Temperature observations were taken by sighting on the rail bars at the instant of cutting by the hot saws, the pyrometer being located so as to view the head of the rails at the first saw, except at one mill where for convenience the base of the rails was sighted as they passed to No. 1 bed. The ingot temperatures were taken as the ingot entered the blooming mill and for each alternate pass. In the conclusions of the authors emphasis is laid on the fact that it is not difficult to control pyrometrically rolling temperatures and it is pointed out that the usual allowance for shrinkage of the rail at the hot saw, by which the finishing temperature is defined, "is unduly high, due in part to pressure from the manufacturers." The summary and conclusions follow:

SUMMARY AND CONCLUSIONS

"The main objects of this investigation were to determine, from measurements taken in representative rail mills, the present American practice regarding the temperatures at which rails are rolled, to demonstrate the ease and accuracy with which such temperatures may be measured, to find out what the "shrinkage clause" in rail specifications really means, and finally to determine for rail steels some of the physical properties, particularly those of interest in manufacture and some of which, it would seem, are not sufficiently well known as yet. Among these last are the expansion, melting ranges, critical ranges and temperature distribution throughout a rail section on cooling.

"Among the results obtained from measurements in four mills are: Ingots for rails are rolled at temperatures ranging from 1075 to 1150° C. (1965 to 2100° F.), and the variation from one ingot to another in a series of 20 to 40 is only 10 to 20° C.

"Rails are finished at temperatures ranging from 880° C. (1615° F.) to 1050° C. (1922° F.), but usually ranging within 50° C. of 935° C. (1715° F.).

"The finishing temperature of each rail may be measured at the hot saws.

"With uniform mill practice the rails of 100-lb. section will be finished at some 10 to 20° C. hotter than 90-lb. rails and about 50° C. hotter than 75-lb. rails.

"It is possible to roll rails, all of which, of a given position in the ingot as A or B, etc., will be finished within ± 10° C. of the same temperature.

"Chemical analyses and metallographic examinations were also made and the mechanical properties determined for a number of samples of rail the rolling of which had been observed. From a comparison of these not very numerous observations, there does not appear to be a sufficient degree of correlation to warrant associating very specifically any of the characteristics defined by these three methods of examination, either with the temperatures of rolling here observed or with each other.

"The following thermal properties of these rail steels were determined in the laboratory:

"The critical range on heating is located (maximum to within 7° C. of 732° C. (1350° F.) for the 10 samples of open hearth and Bessemer steels examined. On cooling, the critical range lies between the limits 680° C. (1256° F.) and 650° C. (1202° F.).

"The melting or freezing range for rail steel extends from about 1470° C. (2680° F.) to nearly the melting point of iron, located at 1530° C. (2786° F.).

"The expansion for open hearth and Bessemer steel is not the same. Above 800° C. (1470° F.) the expansion for both increases linearly with temperature and the linear coefficient per degree centigrade has the following mean values between 0° and 1000° C.:

For Bessemer steel (carbon 0.40 to 0.50 per cent.) ..... $a = 0.0000146$
For open-hearth steel (carbon 0.65 to 0.70 per cent.) ..... $a = 0.0000156$
From shrinkage measurements taken in the rolling mill, open hearth steel (C. = 0.71) has a coefficient between 0° and 1000° C. of..... $a = 0.0000161$

"A rail of 100-lb. section cooling freely in air from a uniform temperature of 1070° C. (1960° F.) reaches its recalescence point at 670° C. (1238° F.) in about 8 min. 30 sec. The maximum difference in temperature between center and outside of head during this cooling is about 85° C. at 1000° C. (1832° F.), becoming 0° again at 670° C.

"A comparison of the shrinkage clause in American rail specifications (for example that of the A. S. T. M.) with the expansion of rail steels shows that this clause permits finishing rails at 1120° C. (2045° F.) or 450° C. (842° F.) above the critical range of rail steel, and above the temperature at which many ingots for rails are actually rolled in practice. Such a shrinkage clause therefore does not serve the avowed purpose of limiting the finishing temperatures to a value slightly above the critical range.

"In conclusion, it should be emphasized that the various series of observations recorded in this investigation are of but a preliminary nature and do not pretend to solve the question of the relations between temperature of rolling and the properties of rails. It would seem desirable, as herein suggested, to make a much more complete and comprehensive study of the various matters mentioned and of related questions than has hitherto been attempted, and on a scale commensurate with the importance to the community of the problem of sound rails."

A Protective Metal Coating

Epicassit is being offered as a protective metal coating by Hess & Son, 1031 Chestnut street, Philadelphia, as American agents. This material consists of tin or lead or alloys of these metals in various proportions, or an alloy of lead, tin and zinc. The metal is first reduced to a powdered condition and this powder is mixed with Epicassit fluid to the consistency of a thick creamy paint. This is applied with a stiff bristle brush and then melted on the surface to be coated by heating the article. Any clean source of heat may be applied such as blow torch, a clean fire or an oven. The coating will not run any more than paint, thus making it possible to cover vertical or inverted surfaces with a protective coating of tin, lead or zinc. It is stated that this coating takes paint well, thus effecting an economy in both paint and labor. Other features of this coating can be ascertained by addressing the agents.

The United States Bureau of Census for 1912 gives the average power generated by the 1260 companies controlling the electric railways of the United States as 4,800,000 kw.-hr. per company. Similar data for the 5221 central stations, including railway and lighting, show an average generation of 2,202,000 kw.-hr. per station. The foregoing compares with an average generation of 9,000,000 kw.-hr. for each of the 225 plants engaged in the iron and steel industry in the United States.

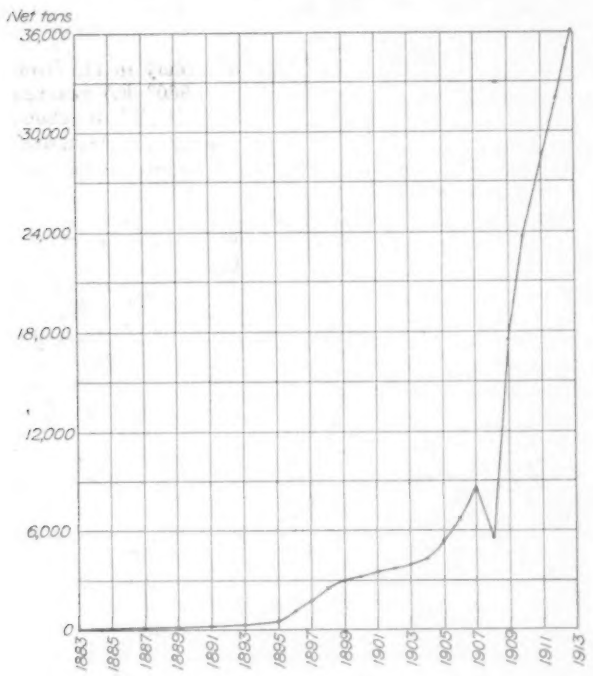
S. DIESCHER & SONS.
Mechanical and Civil Engineers,
PITTSBURGH, PA.

Supply of Aluminum and Its Future Price

Three Groups of Deposits in the South—Increase in Output Will Long Continue—Relation to Copper Cost

BY EDWIN C. ECKEL

The metal aluminum, considered from the industrial standpoint, presents features of general interest. It is one of the youngest of the commercial metals; its increase in annual output has been of startling rapidity, and it is related either as substitute or as alloy to several other metals. There has been a great widening in its sphere of utility, owing to concurrent increase in output and lowering of price; and at present there seems to be no reason to expect the growth in output to cease, though the lowering of price may be near its end. In view of the bearing of these matters upon copper, tin and other commercial metals some discussion of the principal features of the aluminum supply, and of the factors which may tend to aid or limit its growth, may be of general service.



Growth of the American Aluminum Industry, 1883-1913

THE GROWTH OF THE INDUSTRY

Beginning in 1883 with an output of less than 100 lb., the American production of metallic aluminum has increased very rapidly and at a quite steady ratio. he production in net (short) tons is given in the table below for certain selected years, the figures having been converted into tons from the official tables of aluminum production published by the Geological Survey.

	Net tons		Net tons
1883	0.04	1901	3,575
1886	1.5	1904	4,300
1889	23.7	1907	8,605
1892	123.0	1910	23,867
1895	460	1913	36,190
1898	2600		

The steadiness in rate of growth is brought out still more strikingly when the annual outputs are placed in graphic form, as in the accompanying diagram. Here it will be seen that the growth from 1883 to 1907 was not interrupted by even a temporary recession, but that the depressed year of 1908 brought about the first fall in annual output. Taking up its advance again in 1909, the metal showed another slight setback in 1911, but in common with all other commercial activities. It is of course possible enough that 1914, in like fashion, will also show a more or less serious loss in output, for the other commercial metals will certainly not break records this year, and aluminum has now reached such a stage of its development that it is likely to share in the fortunes of its competitors.

THE SOUTH THE SOURCE OF SUPPLY

The main sources of metallic aluminum are the hydrated aluminum oxides—a group of minerals corresponding closely to the similar group of brown iron ores. The chief representative of this group is the mineral known as bauxite, and in common practice no distinction is made between it and the other hydrated aluminum oxides with which it is usually associated, so that the entire series of related minerals are termed bauxite. A similar confusion has long existed in dealing with the brown iron ores, where the term limonite, which is properly the name of one particular iron mineral, is often used to cover the entire group.

In the United States the present supply of bauxite is entirely Southern in origin, the output coming from the States of Arkansas, Alabama, Georgia and Tennessee. The distribution of the ore is, however, wider than might be assumed from the present conditions as to production, and it is probable that in future the mining area will be widely extended. So far as can be determined now, however, the bulk of the production of aluminum ore will always come from the Southern States, for most of the known but undeveloped localities are in the South.

THREE GROUPS OF DEPOSITS

Regarded either geologically or geographically, three different groups of bauxite deposits are known to occur in the South. These groups differ not merely in location, but in their geological associations and, to some extent, in the general characters of their ores.

The most important of the three at present is the series of deposits located in Arkansas, reaching from near Little Rock for some distance southward. The ores here are associated with igneous rocks and may represent in part altered portions of these rocks, though transported and re-deposited ores occur in the same region. The Arkansas region began shipments in 1899, with an annual output which for some years did not average over 5000 tons. From 1903 onward, however, its production increased quite largely, and it is now shipping 150,000 tons or more per year. In the official statistics its output is combined, unfortunately, with that of Tennessee, whose deposits are of entirely different location and character. The Arkansas ore is used very largely in the manufacture of metallic aluminum, while the ore from the Appalachian districts next to be discussed enters chiefly into the alum and general chemical trades.

The second bauxite region is that of the southern Appalachians. Here, reaching from Pennsylvania to Georgia, and following the Shenandoah Valley and its continuations, bauxite deposits are found at intervals. Their associations are much like those of the well-known brown iron ores of the same region, the bulk of the aluminum ore coming from pocket deposits associated with shales and limestones of Cambrian and Ordovician age. Hayes has ascribed their origin to the action of sulphuretted spring waters, rising along faults, on the aluminum silicate of the shales. The explanation is applicable with extreme difficulty to the large series of deposits now known to exist; and it is probable that, as in dealing with the origin of brown ores, there has been too much attempt to comprise very unlike deposits within a single type. The production of this region began in Georgia in 1889, and has continued from Georgia since that date, with Alabama beginning in 1891 and more recently Tennessee in 1907. The Georgia-Alabama output from this region has shown little or no tendency to increase for a number of years past, and has probably passed its maximum of production. Tennessee, on the other hand, will in all likelihood increase its rank as a producer in the future, and Virginia may enter the list later.

The third group of deposits is located in the Coastal Plain region of Georgia, where aluminum ores are associated with comparatively recent sedimentary deposits. These have not yet been seriously developed, and their real extent and commercial importance are still largely uncertain.

At present all the metallic aluminum produced in the United States is made in the North, from Southern and imported ores. The removal of the bauxite duty has increased the possibility of Italian and French competition in ores, and it is even understood that an aluminum plant being erected in the South will run on foreign ores.

There are two plants now under construction or consideration in the South, one at Whitney, North Carolina, the other at Alcoa, Tennessee. The former is controlled by foreign interests; the Tennessee plant will be under control of the Aluminum Company of America. Their operation will tend to increase interest in the development and operation of Southern bauxite deposits located within shipping range.

PRESENT AND POSSIBLE ORES

It has been said that almost the entire world output of metallic aluminum is at present produced from one type of ore—bauxite. In this respect aluminum differs sharply from iron, which occurs in a number of commercially usable mineral forms. Part of the difference in cost of the two metals is due to this fact; for when the question of original or national abundance is investigated, it is found that aluminum is in reality considerably more abundant than iron in the rocks making up the crust of the earth. But this original difference is more than counterbalanced by the fact that the aluminum content of the earth exists almost entirely in the form of silicate, and that aluminum oxides are very rare compared with iron oxides.

It must not be overlooked, however, that this rarity is only relative, and that bauxite of one grade or another is far from being a scarce mineral. But it is scarce as compared with hematite, magnetite and the brown iron ores; and one limitation on the ultimate cheapness of metallic aluminum is thus brought into view. With this fact in mind, much attention has been directed toward reduction of metallic aluminum from one or more of the aluminum silicates which are so common in nature. Clay has been a favorite medium for use in this line of experiment, and numberless processes have been devised and patented covering some method of producing aluminum from clay. The chemical difficulties are, of course, not insurmountable, but the commercial side of the matter is very different. So far as we can see now it will always be cheaper to make aluminum from bauxite than from any aluminum silicate. It would take great changes in cost of electricity or of chemical reagents to reverse this condition, even if we assume that bauxite deposits are much scarcer than present knowledge seems to indicate. What may fairly be expected, perhaps, is that the world's output of the new metal will continue to increase for a long time to come, and that we may in the near future find the aluminum output being made at a slightly lower cost than copper, pound for pound. At present, from the scanty data available, it seems probable that the average cost of producing metallic aluminum all over the world is between 25 per cent. and 50 per cent. in excess of the average cost of making copper.

As against tin, the other metal which meets aluminum as a competitor, the case is more definitely in favor of aluminum. For, as pointed out in a recent article, tin seems on the way to becoming a very scarce metal, indeed, while aluminum has still ample ore supplies and some decreases in cost to aid it.

Pennsylvania Railroad Testing Plant and Laboratory

The Pennsylvania Railroad Company has just completed and is occupying a concrete building to contain the testing plant and electrical laboratory for its shops at Altoona, Pa. The machinery for the testing of couplers, brakes, steel bars and heavy material is located in the basement and on the first floor. One machine is capable of crushing at a pressure of 1,000,000 lb. This machine is also used for determining the lifting strength of connections. In the electrical department is a large electric light globe testing plant with which 960 bulbs can be tested at one time. Explosives will be stored in an explosion-proof department in the basement. The walls are of concrete and 2 ft. thick. The floors of the building are an experiment. On a 5-in. layer of sawdust has been placed a ½-in. covering of red cement. The process was discovered in and the materials are imported from Greece. It deadens sound and is easier on those who do their work standing.

Suction Lubricator for Compressed Air Devices

A lubricator designed particularly for use on devices operated by compressed air has been brought out by the Vulcan Engineering Sales Company, 2059 Elston avenue, Chicago, Ill. A chamber containing an absorbent is kept saturated from another large oil storage chamber surrounding it, and air passing through the lubricator becomes sufficiently charged to lubricate properly all surfaces with which it subsequently comes in contact. This suction action takes place as soon as the air moves and ceases the instant the supply of air is cut off, the amount of oil taken up being moderate although continuous while the air is in use. The lubricator is made in three sizes, for ¾, 1 and 1½ in. pipe connections and is intended to be attached to the air line in any position. It will, it is claimed, operate at any angle and can be filled irrespective of the position in which it may be placed.

The Foote-Burt Company, Cleveland, Ohio, reports a very satisfactory demand for drilling machinery, orders holding up well both from the automobile trade and from other industries. The company's plant is being operated at full capacity, with some departments working overtime.

ESTABLISHED 1855

THE IRON AGE

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Quicker Commission Action Needed

The slowness with which the Interstate Commerce Commission handles cases brought before it is shown in a communication from our Washington representative, which appears elsewhere. Our readers are aware of the confusion existing with regard to the new freight rates on Southern pig iron from Alabama points to Northern centers of consumption. It appears that in the Sloss-Sheffield case quite a number of railroads over which Southern pig iron is hauled were omitted from the enumeration of those against which the claim was made for a reduction in rates. The reduction of 35 cents per ton was put in effect October 1 on the lines named in the case, but the lines not named have failed to make the reduction. This has been brought to the attention of the Interstate Commerce Commission by consumers located along the lines not named, in the expectation that an order would be issued to these lines to make the same reduction.

It appears, according to the information secured by our Washington representative, that it is not in the power of the commission to make an order of the kind asked for. It will be necessary to get up an entirely new case. The surprising development in this connection is that such a case can hardly be decided in less than six months. The course of procedure is as follows: When the complaint is filed and served on the defendant roads, they are allowed 20 days to reply. If the roads do not voluntarily make the desired change, 15 days' notice will be given of the date set for the hearing of the case. After the evidence is in, the complainants will be given 30 days in which to file their brief, when 15 days will be allowed for the filing of the defendants' brief and 10 days for the complainants' reply brief. If argument is necessary, 10 or 15 days may then be required. Our representative states that after the case is submitted the commission usually takes about 90 days before its decision is handed down.

It will be seen from the above statement of the course of proceedings before the Interstate Commerce Commission that it is a most deliberate body. The method followed would appear to be that of a court having charge of the trial of civil cases, in which ample time is usually given to the interested parties for the preparation of their various briefs and replies. In such cases the element of time is not of prime importance. The parties to the suit are more anxious to secure an equitable settlement of the case at issue than to have the matter adjusted forthwith. The questions to be settled by the Interstate Commerce Commission are, however, of a radically different character. They are business questions which from their nature should be decided as quickly as consistent with fairness to both parties. A case brought before the commission ought to be settled in much less time than three months. To drag it out for six months or longer is an offense against the interests involved. Much may occur to change the character of business in three months, while the whole condition of a trade may reverse itself inside of six months. If the question raised is of a serious character to some of the parties, they may suffer considerable loss within that time, which would be avoided by a prompt decision.

If a concrete example had been needed of the inability of the Interstate Commerce Commission to grasp the business situation, it is afforded in this instance. The commission should change its methods so as to conform more closely to business practice. The manufacturer or merchant who would procrastinate with one of his customers for six months would lose his reputable standing in business circles. He would be obliged to reach something definite a great deal sooner. It is unfortunate that the power does not rest with some other governmental body to direct the commission how to proceed. It should be an assistance to business interests and not an obstruction.

Old Low Points in Iron Production

Current indications being that an extremely low point in iron and steel production will be reached in the near future, comparisons with what has occurred in the past become of interest.

In the depression of the eighteen-nineties the smallest pig iron production in a half year was in the second half of 1893, 2,561,584 tons, this being 52 per cent. of the record half-year production, in the second half of 1891, so that the production was undoubtedly considerably less than one-half the capacity. The rate at which the steel works operated at that time cannot be stated with accuracy, and would not be in point in any event, as the supplanting of wrought iron by steel was still in progress, and the iron mills felt the depression much more keenly than the steel mills. In the second half of 1896 occurred another low point in pig iron production, the output being much larger than at the previous time, but constituting nearly as low a percentage of the existing capacity.

The sharp reaction of 1900 is remembered as one in prices rather than in mill and furnace operation. Somewhat the same statement can be made as to the depression of 1903-4, there being a restriction to 50 or 60 per cent. of capacity for no more than an insignificantly short time.

The greatest period of idleness since the depression of two decades ago was that of 1908. It began with a spectacularly sharp slump. In October, 1907, pig iron was produced at the record rate of 28,000,000 tons a year, while the production in the January following, three months later, was at the rate of 12,500,000 tons, showing a decrease of 55 per cent. The decrease in the rate of steel works operation was even greater, for the production of pig iron by steel works furnaces decreased from October to December, only one month intervening, by 56½ per cent. For several weeks the steel works themselves must have made and finished steel at less than 40 per cent. of their capacity. It was a panic condition, however, and therefore only temporary. It was said that most buyers canceled their specifications, and those who did not became objects of such suspicion that the mills canceled their specifications for them. The average record of the first six months of 1908 was more representative of the real industrial situation. During that period the steel mills operated at an average of about 50 per cent. of capacity, there being a measurable improvement in the second half of the year. A point to be considered, however, is that there was much new construction on the boards at the close of 1907, and such work was practically suspended. If it had been brought to completion within the limits assigned by physical conditions, the production of steel throughout 1908 would hardly have averaged 50 per cent. of the existing capacity.

In the off year 1911 production and prices moved in opposite directions. At the opening of the year, for the first two months, the mills did not operate at an average of more than 50 per cent. of capacity, and they increased to about 75 per cent. in the late months of the year, even though prices fell until about the close of November.

Last winter the mills did not drop to an average of operating at only 50 per cent. for as long as three months, but in a period of weeks embracing the holidays they operated at about 40 per cent.

Thus over a long period of time it appears that it is no very remarkable thing for the steel mills to operate at only 50 per cent. of capacity, for perhaps two or three months, but that even under the most exceptional conditions they have rarely if ever operated at as low a rate as 40 per cent. for more than a very few weeks indeed. Whether a new record is now to be made the next few weeks will determine. Our blast furnace returns for September show that even under the semi-paralysis which came upon the steel industry last month, pig iron production was 2000 tons a day more than in January, though capacity active October 1 was about 400 tons a day less than the January rate. Production today is at the rate of about 22,200,000 tons a year, including charcoal iron, or somewhat more than 63 per cent. of the country's effective blast furnace capacity, which we may put at 35,000,000 tons. We are thus some distance from the low percentages of the records cited above.

The Rise and Fall of Metals

The price movements of tin and spelter since the war started have been highly spectacular. In eight days by the calendar, but in only six business days, spot tin in New York more than doubled in price, being 31 cents on July 30 and 65 cents on August 7, the market then remaining at approximately that level for several days, but falling back to 31 cents on September 25. The price of tin is by no means a small matter, as the consumption of the United States in a good year is about 50,000 gross tons, and the extreme advance, if maintained, would have meant no less than $38,000,000 for a year's consumptive requirements.

The market movement in tin was the more spectacular from the fact that at no time was there an actual immediate shortage. No consumers of importance were forced to curtail operations, and the supplies in existence in the country were sufficient, if equally distributed, to permit all consumers to continue operations for several weeks. The reason the market price was affected so greatly was that tin is not an article of individual or separate consumption, or one that can be replaced by other material in a pinch, and the commodities with which it is used have an ultimate market value dozens of times that of the tin itself. For illustration, at the hight of the scare it was thought possible that the perishable food crops might not all be packed, through lack of solder, but the amount of tin present in the solder of a can of fruit or vegetable is almost infinitesimal. In tin plate, a commodity absolutely essential in many industries, a pound of pig tin represents the coating of more than 100 square feet.

The latter part of the decline in tin occurred when it became fairly well established that for a time at least there would be no very serious interruption to the vessel movement from the Far East, but the beginning of the decline occurred when the war was so young, not a fortnight old, that there could be no such assurance, and one may properly surmise that it was due to sober reflection that a difference of 35 cents a pound between Singapore and New York, $784,000 on a cargo of only 1000 tons, would be sufficient to encourage the taking even of very considerable risks of capture.

The rise in the quoted price of spelter was, in its way, more unreasonable than the great bulge in the tin market. Spelter was 4.80 cents to 4.90 cents, East St. Louis, throughout July, but rose to asked prices of 5.90 cents to 6.00 cents in the closing days of August. The market has since returned to the July level. Taking the rise at one cent and the United States consumption at 340,000 net tons, the money equivalent of the rise upon a year's consumption was $6,800,000. The particularly curious feature of the rises in tin and spelter respectively was that the tin rise was based upon its being impossible to move tin across the water, while the spelter rise was based upon expectations that spelter would be so moved. Tin advanced because we were going to be unable to import it; spelter advanced because we were going to export it. The war risk might have made spelter very high priced in England, but the asked prices quoted above were f.o.b. East St. Louis.

The actual facts destined to control the spelter situation were public property, and were discussed in *The Iron Age* of August 27, it being pointed out there that England had been drawing from the Continent only about 150,000 tons a year of spelter, while there were in the United States on July 1 stocks in the hands of producers, of 64,039 tons, and the United States appeared to have a producing capacity 200,000 tons a year in excess of the consumptive rate shown for the first six months of the year. It was not, however, until about September 1 that spelter began definitely to decline. During August and September a total of about 20,000 tons was exported from the United States to England, this being a trifle less than England's normal imports from the Continent in two months. There is reason to believe that the purchases of spelter by consumers in the United States, at say 5½ cents or over, were practically nothing at all, though the market stood at that figure or higher for four weeks.

While the tin market advanced because there were fears that the metal could not be imported, and spelter advanced because it was thought an important export trade might develop, copper declined because the export market was curtailed. The reduction in copper exports appears, thus far, however, to have been equivalent to only between 15 and 20 per cent. of our production. A further curtailment is perhaps to be expected, while the domestic consumption has been very considerably curtailed. The decline in copper is not altogether chargeable to the war, seeing that Lake copper at the beginning of July was about 14 cents, dropping one cent in July, and then only one-half cent during August and another half cent during September. The market, possibly, has not fully reflected the conditions. In tin and spelter more was reflected than the actual conditions.

A Tax on American Plants in Germany

The German government has asked the owners of all industrial works located in the empire to pay to dependents of employees who are serving in the army and navy one-half wages while the war lasts. This is not a command but a request. It applies to the German plants which have been established by American manufacturers, and most, if not all of them, have acceded to the request.

The German factories of American companies are now operating on about a 50 per cent. basis. From advices received recently approximately one-half of their employees have been called to the colors. Of these men a very considerable number have persons dependent upon them—wives and children, fathers and mothers, brothers and sisters. The burden imposed is a large one. Presuming that 200 men were employed in a factory before mobilization began, 100 men were withdrawn for service in the army. Taking the average wage at $8 a week, the total pay-roll was $1600, and the wages which had been received by the newly-created soldiers totaled $800. If three-fifths of these enlisted men had dependents the employer has assumed an obligation of one-half of $480 a week, or $12,480 a year.

This is a very heavy addition to overhead charges. Yet the alternative of refusing the request of the government was almost impossible. In Rome one must do as the Romans do. The American investor in Germany must suffer with the German investor.

CORRESPONDENCE

Duty on Advertising Matter to Canada

To the Editor: Referring to the letter of the above title by "Exporters," in *The Iron Age* of September 24, why would it not be proper to send catalogues to Canada only on condition that the Canadian pays the duty? As Exporters say, "American manufacturers are willing to pay the duty," but as a gentle reminder to the Northern neighbors that their tax is unjust, we could easily make them bear the brunt themselves, and they would perhaps soon see the folly of their move.

A manufacturer who prints a total of only, say, 3000 catalogues, could hardly afford to send the set-up plates to Canada just to print 500 or so, the probable number that he would mail to Canada. The total cost of such methods would doubtless be far in excess of the cost of printing in the United States, plus duty.

With reference to the statement in Exporters' letter: "There is no country in the world that can duplicate American catalogue work," I might say that I know of an American manufacturer who makes plates for his catalogues in the United States because American engraving is unbeatable and still not expensive, and he then sends the plates to Germany for printing on the less expensive and at the same time high quality German stock. He then imports the catalogues and has the plates returned at a total cost which he claims is quite satisfactory. Of course, this is a cumbersome method in many ways and in most cases would be impracticable.

W. F. SCHAPHORST.

New York City.

Periodicity of Panics and Depressions

To the Editor: If I may be so bold, I would point out that not all students of the interesting subject of panics and depressions in trade are wedded to the theory that trade cycles are of either 15 or 20 years' periodicity, as your recent editorials would lead one to believe. By referring to the article that appeared in *The Iron Age* of October 24, 1907, on "Trade Cycles," you will observe that the periodicity there recorded from well known state of trade in the past in no wise depends upon either 15-year or 20-year cycles.

While this article was written and given space in your publication as an interesting piece of research, it was not claimed by the author to be a basis for predicting panics and depressions; the cycles were simply carried ahead upon the same periodicities in order to show where they would land as a matter of interesting study for future reference.

It is interesting, however, to observe that depressions have occurred in two instances since the preparation of the article and these within a very few months either way of the time indicated on the charts. Judging from the number of commendatory letters the writer has received since its publication—one within the last two weeks—it has served its purpose of arousing some interest in the study of the subject.

HERBERT FOSTER.

New Haven, Conn., October 1, 1914.

In the article in *The Iron Age* of October 1, headed "Greenawalt Iron-Ore Sintering Plants" it was stated that the Greenawalt process is controlled by the American Grondal Company. This is an error. The process is controlled by J. E. Greenawalt personally, the American Grondal Company having only a part interest in the foreign patents. The reference in the same connection to Grondal installations should have been "Greenawalt installations."

British Steel Companies Reduce Dividends

Some figures regarding the business of Bolckow, Vaughan & Co., Ltd., Middlesbrough, England, for the year ended June 30, 1914, are given in the London Economist. A very substantial decline is shown as compared with the previous year. The gross profits were about $1,400,000 lower. A comparison of the results for the past three years is given below:

	Gross profit	Depreciation and extensions	Interest and preferred div.	Balance
1911-12	$1,594,305	$799,435	$280,595	$514,275
1912-13	3,261,275	809,250	271,840	2,180,185
1913-14	1,856,305	732,160	257,755	866,390

In 1911-12 the long coal strike interfered seriously with the company's activities. Nothing has been written off capital expenditure for the past year, as compared with $800,000 the previous year, but the allowance for depreciation and extensions is only slightly lower. The balance sheet shows a shrinkage in "cash in hand and at the bank" from $570,085 at the close of the previous year to $195,865 at the end of the last year. As will be observed in the above table, the regular preferred dividend has been paid, but the dividend on the common stock has been reduced from 10 per cent. to 6 per cent., and of this half is to be paid now, the other half, in view of the war, to be paid when the directors think it advisable to do so.

The annual meeting of the Steel Company of Scotland, Ltd., was held September 16 at Glasgow, at which announcement was made by the chairman, Dr. William Lorimer, that it had been found necessary to reduce the dividend from 10 to 5 per cent. He added that restricted demand had prevailed in all the company's markets in every part of the world. It had further to face not only home competition, but some from America and a very fierce subsidized competition from Germany, the effect of which was that prices had been forced down to a perfectly unremunerative point. Taking all the circumstances into account, the company had done very well indeed. Announcement was further made that the company had acquired 175,000 shares of the Appleby Iron Company, Ltd., for the purpose largely of trying to recapture the trade that Germany had taken. The Appleby Company is in position to take advantage of any increased demand for pig iron, but in the present condition of affairs it was not possible to say when its new steel plant would be started. Obviously this was not the time to provide capital for a new steel plant.

To Report on Canadian Iron Mining Industry

Pursuant to a request made to the government for the granting of some measure of assistance toward the development of iron-ore mining in Canada, and in accordance with the statement of the Minister of Finance in his budget speech during the 1913-14 session of Parliament, that the iron-mining industry would be investigated, a committee has been appointed to inquire into the situation and to report the facts to the government. Every owner or operator of an iron-ore property in Canada should be interested in facilitating this inquiry and should communicate with the Deputy Minister of Mines at Ottawa, or the secretary of the committee, John McLeish, who will furnish a schedule of questions covering the information required.

New Sheet Mill at Cleveland

A new sheet plant will be built in Cleveland, Ohio, by the Empire Rolling Mill Company. A building 145 x 528 ft. will be erected adjoining the company's present rolling mill. It will be equipped with six mills. The company will roll both iron and steel sheets, and will install a galvanizing plant for making galvanized sheets. Considerable attention will probably be devoted to making various high-grade and special sheets. The erection of the plant will be started as soon as the financial situation shows an improvement. The Empire Rolling Mill Company is one of the affiliated interests of the Bourne-Fuller Company, Cleveland, which acts as its selling agent.

CONTENTS

Williams Drop Forging Plant at Buffalo 817
Adapting a Machine for Special Work 821
Committees for Controlling Manufacture 822
The New Gary 36-Inch Slabbing Mill 824
Measurements of Modern Blast Furnaces 828
A Simple Design of Steel Railroad Tie 830
Compression Starters for Large Motors 831
Evening School of Engineering at Pittsburgh 831
Grinding Machine with Protected Wheel 832
Cold Rolled Steel Plate Sheet Piling 832
Additional British Contraband of War 832
Lea-Courtenay Company Increases Facilities 833
A Heavy Duty Lathe for Turning Rolls 833
Preventing Piping in Steel Castings 834
Rail Finishing Temperatures 837
A Protective Metal Coating 837
Supply of Aluminum and Its Future Price 838
Pennsylvania Railroad Testing Plant and Laboratory 839
Suction Lubricator for Compressed Air Devices 839
Quicker Commission Action Needed 840
Old Low Points in Iron Production 840
The Rise and Fall of Metals 841
A Tax on American Plants in Germany 842
Correspondence 842
British Steel Companies Reduce Dividends 843
To Report on Canadian Iron Mining Industry 843
New Sheet Mill at Cleveland 843
New German Wire Syndicate 843
Production Falling 844
Conditions in German and Austrian Steel Trades 845
Blast Furnace Notes 845
The Iron and Metal Markets 846
Paterson Industrial Exposition 857
Book Review 858
Records of New Commercial Attaches 858
Philippine Iron and Steel Imports 859
Co-operation in Export Trade in Steel 860
Obituary 862
July Exports and Imports 862
Pittsburgh Manganese Ore Company 863
Decrease in Foundries 863
Pittsburgh and Nearby Districts 864
Pittsburgh Foundrymen's Association 864
Personal 865
Lake Ore Shipments in September 865
New Southern Iron Rates 866
Carnegie Steel Company May Reduce Wages 866
The Machinery Markets 867
The Harvester Decree Amended 873
Trade Publications 874

New German Wire Syndicate

The London Ironmonger notes that syndicate making in Germany has not been wholly stopped by the war. The Frankfurter Zeitung announces the registration of the Deutsche Drahtgesellschaft, a syndicate of wire-drawing firms. Its objects are stated to be the finishing of rough rolled wire, and the sale of the manufactured product at home and abroad. The syndicate, which has a nominal capital of 100,000m., has been concluded for a term of five years as from July 1, 1914, but it may be dissolved at the end of three years if four-fifths of the votes at a general meeting are given in favor of such a course, and any of the works supplying the raw material is entitled to withdraw if during any period of settlement the net price paid by the syndicate for rolled wire falls below 88m. per ton. If two works supplying raw material withdraw under this clause, any of the finishing works may do likewise. Dissolution may be carried by a mere majority if the sales of finished wire in any half-year fall below a specified minimum.

A branch of the Western Scrap Iron and Steel Association, Chicago, was organized in Cleveland, Ohio, at a meeting held at the Statler Hotel, October 5. This branch will be known as the Central Division of the association and starts out with a membership of 15, composed of dealers who were in attendance from Cleveland, Youngstown, Toledo, Columbus, Erie and Detroit. E. A. Schwarzenberg was elected president and Myron Cohen secretary. The next meeting will be held January 5. The annual meeting of the parent organization, the Western Scrap Iron and Steel Association, will be held in Chicago January 19.

PRODUCTION FALLING

September Pig-Iron Output Smallest Since January

Net Loss of 11 Furnaces—Merchant Make Lowest in Three Years

Furnaces are still blowing out and our pig-iron statistics for September show the lowest rate of production since January. The month's total was 1,882,577 gross tons, or 62,753 tons a day, against 1,995,261 tons, or 64,363 tons a day, in August. Merchant pig-iron output fell off about 1000 tons a day, to 16,409 tons (the lowest since September, 1911) and that of steel works furnaces about 600 tons a day. On October 1 the 176 furnaces active, or 11 less than on September 1, had a capacity of 60,427 tons a day, against 64,303 tons a day for the 187 furnaces in blast September 1.

DAILY RATE OF PRODUCTION

The daily rate of production of coke and anthracite pig iron by months, from September, 1913, is as follows:

Daily Rate of Pig-Iron Production by Months—Gross Tons

	Steel works	Merchant	Total
September, 1913	60,941	22,590	83,531
October	59,630	22,503	82,153
November	52,434	22,019	74,453
December	41,879	22,108	63,987
January, 1914	40,691	20,117	60,808
February	47,479	19,974	67,453
March	54,990	20,748	75,738
April	54,508	21,157	75,665
May	47,028	20,478	67,506
June	44,321	19,595	63,916
July	45,027	18,123	63,150
August	46,937	17,426	64,363
September	46,344	16,409	62,753

OUTPUT BY DISTRICTS

The accompanying table gives the production of all coke and anthracite furnaces in September and the three months preceding:

Monthly Pig-Iron Production—Gross Tons

	June (30 days)	July (31 days)	Aug. (31 days)	Sept. (30 days)
New York	124,374	118,471	117,567	109,569
New Jersey	10,327	10,825	10,698	8,559
Lehigh Valley	63,640	60,714	52,112	49,115
Schuylkill Valley	64,392	67,056	66,584	56,604
Lower Susquehanna and Lebanon Valley	30,377	31,250	32,163	31,217
Pittsburgh district	424,590	455,873	507,250	483,973
Shenango Valley	67,915	67,291	70,752	68,391
Western Pennsylvania	115,470	125,364	99,178	104,778
Maryland, Virginia and Kentucky	59,218	51,150	49,561	38,186
Wheeling district	74,982	72,318	72,787	80,289
Mahoning Valley	207,693	216,134	237,909	214,916
Central and Northern Ohio	136,021	140,181	140,019	126,208
Hanging Rock and S. W. Ohio	31,746	19,944	15,118	11,314
Chicago district	286,644	289,368	287,533	267,339
Mich., Minn., Mo., Wis. and Col.	59,438	61,423	62,643	63,258
Alabama	144,521	151,612	156,623	152,453
Tennessee	16,435	18,671	16,764	16,408
Total	1,917,783	1,957,645	1,995,261	1,882,577

PRODUCTION OF STEEL COMPANIES

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies show the following totals of product month by month. Only steel-making iron is included in the figures below, together with ferromanganese, spiegeleisen and ferrosilicon. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Pig, total production			Spiegeleisen, ferromanganese, etc.		
	1912	1913	1914	1912	1913	1914
Jan.	1,483,153	1,981,560	1,261,430	22,622	15,633	17,325
Feb.	1,550,995	1,792,154	1,329,414	15,950	20,131	10,524
Mar.	1,827,792	1,904,878	1,704,688	11,538	20,546	20,133
Apr.	1,830,717	1,939,751	1,635,226	11,104	23,108	18,676
May	1,922,557	1,991,192	1,457,847	20,518	19,042	21,504
June	1,823,958	1,860,070	1,329,623	26,685	19,212	16,254
July	1,803,205	1,840,216	1,395,851	26,522	22,310	16,524
Aug.	1,843,404	1,833,352	1,455,054	24,225	20,680	11,577
Sept.	1,773,073	1,828,232	1,390,322	22,484	24,555	13,786
Oct.	1,947,426	1,848,634	.....	27,252	19,499	.....
Nov.	1,884,524	1,573,007	.....	17,461	26,765	.....
Dec.	1,976,870	1,298,262	.....	18,523	14,095	.....

CAPACITY IN BLAST OCTOBER 1 AND SEPTEMBER 1

The following table shows the daily capacity, in gross tons, of furnaces in blast October 1 and September 1, by districts:

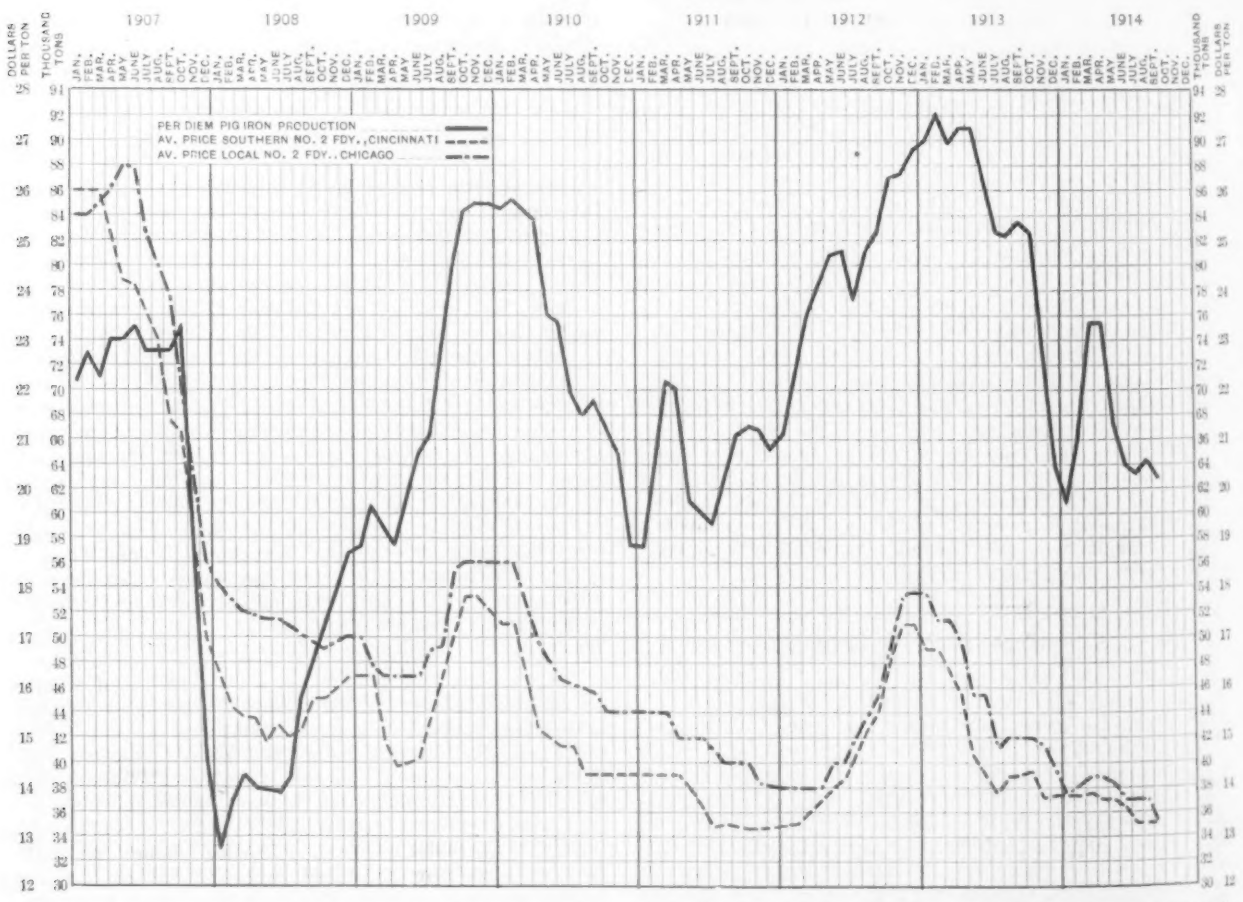

Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from January 1, 1907, to October 1, 1914; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace

Coke and Anthracite Furnaces in Blast

Location of furnaces	Total number of stacks	Oct. 1 Number in blast	Oct. 1 Capacity per day	Sept. 1 Number in blast	Sept. 1 Capacity per day
New York:					
Buffalo	19	10	3,213	11	3,580
Other New York	7	2	440	2	452
New Jersey	7	1	215	2	345
Pennsylvania:					
Lehigh Valley	22	7	1,541	6	1,593
Spiegel	2	2	153	1	88
Schuylkill Val.	16	5	1,807	7	2,148
Lower Susquehanna	7	2	519	2	494
Lebanon Valley	10	3	521	3	543
Pittsburgh Dist.	52	32	15,214	35	16,207
Ferro	4	2	221	2	285
Shenango Val.	19	7	2,145	7	2,242
Western Pa.	27	11	3,493	11	3,284
Maryland	4	1	392	1	397
Wheeling Dist.	14	7	2,676	7	2,522
Ohio:					
Mahoning Val.	25	16	6,887	18	7,674
Central and Northern	24	10	4,003	11	4,252
Hanging Rock & S. W. Ohio	15	4	439	2	168
Illinois and Ind.	34	18	8,655	21	9,683
Ferro	2	1	48	0	0
Michigan, Wis. & Minn.	10	5	1,349	5	1,271
Colo. and Mo.	8	2	759	2	750
The South:					
Virginia	24	3	418	6	749
Kentucky	5	2	317	2	253
Alabama	45	18	5,000	19	4,782
Ferro	1	1	85	0	0
Tennessee	20	4	547	4	541
Total	423	176	60,427	187	64,303

The list of blast furnaces blown in last month includes one Lock Ridge and one Palmerton in the Lehigh Valley, Midland in the Pittsburgh district, New Castle No. 1 in the Shenango Valley, Lawrence and Sarah in the Hanging Rock district, and one Clifton in Alabama.

Among the furnaces blown out in September were one Buffalo Union at Buffalo, Musconetcong in New Jersey, Leesport and Warwick A in the Schuylkill Valley, Clinton, one Eliza, one Isabella and one Carrie in the Pittsburgh district (banked), one Shenango in the Shenango Valley (banked), Covington, Oriskany (banked) and Radford Crane in Virginia, Hannah and No. 1 Haselton in the Mahoning Valley, No. 1 Cleveland in Ohio, No. 2 Calumet and No. 2 Federal in the Chicago district and No. 1 Ensley in Alabama.

DIAGRAM OF PIG-IRON PRODUCTION AND PRICES

The fluctuations in pig-iron production from January, 1907, to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of daily average production, by months, of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron at furnace at Chicago. They are based on the weekly market quotations of *The Iron Age*. The figures for daily average production are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907—Gross Tons

	1907	1908	1909	1910	1911	1912	1913	1914
Jan.	71,149	33,918	57,975	84,148	56,752	66,384	90,172	60,808
Feb.	73,038	37,163	60,976	85,616	64,090	72,442	92,369	67,453
Mar.	71,821	39,619	59,232	84,459	70,036	77,591	89,147	75,738
Apr.	73,885	38,289	57,962	82,792	68,836	79,181	91,759	75,665
May	74,048	37,603	60,753	77,102	61,079	81,051	91,039	67,506
June	74,486	36,444	64,656	75,516	59,585	81,358	87,619	63,916
July	72,763	39,287	67,793	69,305	57,841	77,738	82,601	63,150
Aug.	72,594	42,851	72,546	67,963	62,150	81,046	82,057	64,363
Sept.	72,783	47,300	79,507	68,476	65,903	82,128	83,531	62,753
Oct.	75,386	50,554	83,856	67,520	67,811	86,722	82,133	.....
Nov.	60,537	51,595	84,917	63,659	66,648	87,697	74,453	.....
Dec.	39,815	56,158	85,022	57,349	65,912	89,766	63,987	.....

THE RECORD OF PRODUCTION

Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1910—Gross Tons

	1910	1911	1912	1913	1914
Jan.	2,608,605	1,759,326	2,057,911	2,795,331	1,885,054
Feb.	2,397,254	1,794,509	2,100,815	2,586,337	1,888,670
Mar.	2,617,949	2,171,111	2,405,318	2,763,563	2,347,867
Apr.	2,483,763	2,064,086	2,375,436	2,752,761	2,269,955
May	2,390,180	1,893,456	2,512,582	2,822,217	2,092,686
June	2,265,478	1,787,566	2,440,745	2,628,565	1,917,783
July	2,148,442	1,793,068	2,410,889	2,560,646	1,957,645
Aug.	2,106,847	1,926,637	2,512,431	2,545,763	1,995,261
Sept.	2,056,275	1,997,102	2,463,839	2,505,927	1,882,577
Oct.	2,093,121	2,102,147	2,689,933	2,546,261	.....
Nov.	1,909,780	1,999,433	2,630,854	2,233,123	.....
Dec.	1,777,817	2,043,270	2,782,737	1,983,607	.....

Conditions in German and Austrian Steel Trades

In its weekly abstracts from German papers, the London Ironmonger gives the following:

The Kölnische Zeitung of August 27 quotes the chairman of one of the Austrian steelworks as stating that at present all deliveries are suspended. Current requirements in iron and steel materials are chiefly filled by the merchants, but their stocks are being rapidly depleted. This state of things will result in large orders being given by the trade to the works, and this will affect prices.

The proprietors of steel works in western Germany (Rhenish-Westphalian district), who, with the collieries, employ about half a million hands in normal times, appear to hold the view that, if the war should be prolonged, large orders will be placed not only for German, but also for Austrian and Italian account. At the outbreak of war many works had sufficient orders on their books to keep their reduced staffs employed for two or three months. The works are unwilling to quote prices for distant delivery, but the general opinion is that, although the situation may temporarily grow worse, it is likely to improve as time goes on.

The Elberfeld chamber of commerce has appealed to the authorities to permit the exportation of merchandise to neutral states to be resumed as soon as possible. Many firms, the chamber says, have large orders on hand from Scandinavia, Switzerland, Holland, Italy and Austria-Hungary, but they cannot execute them because freight traffic is stopped. The chamber also calls attention to the danger attending industrial idleness.

Blast Furnace Notes

The Sloss-Sheffield Steel & Iron Company blew out its City furnace No. 2 at Birmingham, Ala., on August 31 and blew in its City furnace No. 1 on September 1.

No. 1 blast furnace of the Shenango Furnace Company at Sharpsville, Pa., which was recently relined and enlarged, is making some very good records for output. On Monday, October 5, it turned out 570 tons of basic iron.

Four furnaces were added to the idle list in the Pittsburgh district in September—one Carrie, one Isabella one Eliza and Clinton.

Only three furnaces were in blast in Virginia at the opening of October—Alleghany at Iron Gate, Pulaski at Pulaski City, and Crozer at Roanoke.

The one furnace of the Bessemer, Ala., group of the Tennessee Coal, Iron & Railroad Company which was active in September was running on ferromanganese most of the month.

Butterfield & Co., Inc., Derby Line, Vt., manufacturers of screw plates, are placing on the market the combined automobile screw plate. This screw plate contains taps and dies, cutting the S. A. E. standard, and also the regular V thread or the U. S. standard as may be wanted, all complete with stocks for holding the dies, and high grade tap wrench, in hardwood case. The claim made for this plate is that heretofore the repair and garage man wanting both forms of thread was obliged to buy two distinct screw plates, whereas he can now get both styles in one box, and at a reasonable price. These plates are put out in all the various assortments, cutting from ¼ in. to 1 in. and are made in the company's well-known Derby style.

In the week ending October 1 the exports of wheat, including flour, from the United States and Canada aggregated 9,963,550 bushels, being the largest for a single week in the history of the United States. This compares with 6,858,639 bushels in the previous week, and 6,213,581 bushels in the corresponding week of 1913. For the 13 weeks ending October 1 exports were 95,987,055 bushels, against 73,292,257 bushels in 1913. Corn exports for the week ending October 1 were 217,960 bushels, against 299,427 bushels in the preceding week and 12,254 bushels in 1913. For the 13 weeks ending October 1 corn exports were 1,152,367 bushels, against 895,259 bushels last year.

The Iron and Metal Markets

CONTRACTION IN BUYING

New Orders at the Year's Lowest Rate

Pig Iron Output Smallest in Three Years—Steel Exports Growing

Contraction in the volume of new orders for steel products continues. Its effect on the operation of mills has not been pronounced thus far, though in some lines specifications also are falling off considerably, but it is plain that running schedules must be cut down more before they improve.

The Steel Corporation's total of unfilled orders which will be published this week is expected to show a large reduction for September. Last week its ingot production was at 60 per cent. of capacity. New orders have fallen off sharply with all steel companies in the first week of October. Some have booked at 25 per cent. of capacity this month; in the Chicago district the rate has been but little over 10 per cent. Following the record of the year another buying movement would be due in December. The preceding ones were January-February and June-July.

The posting of the required 90-day notice of wage readjustment by the Carnegie Steel Company has been widely interpreted as pointing to a general reduction. The fact is that while formerly this notice was given each year, whether reductions were made or not, it has been omitted for two or three years and now its posting is resumed. For the Steel Corporation the statement has been made that it has not now any intention of reducing wages.

Publications of specific export orders for steel in the past week have included much guesswork. Other weeks since the war opened have had larger totals, but the volume is still good. Thus far none of the expected 100,000 tons of sheet bars for Great Britain has come to this country. Wire rod and wire business has been notable and some late sales of skelp have been made. European governments have ordered on a considerable scale in several lines, and the machine tool trade has been more cheerful as this business has grown and home shops have had to buy tools to do foreign work.

Canada has done some exporting of wire rods and wire products from its Nova Scotia steel plant and our London cable reports c.i.f. prices of $32.24 for rods and $2.07 for nails from Sydney.

Plate mills have been the hardest hit by the stagnation in railroad and other home buying and there is a larger percentage of idle plate capacity than in any other line. At Chicago prices have got to a 1.10c., Pittsburgh, basis and 1.15c., Pittsburgh, can readily be had in the East. The two battleships on which bids were opened this week will each require 13,000 to 14,000 tons of plates.

The Lackawanna's latest rail order, about 13,000 tons, has been virtually closed, going to an Eastern Pennsylvania and a New York State mill. The Southern Railway will buy 3500 tons additional. For the present the C. H. & D. orders for 2000 cars reported placed some weeks ago, are held up for lack of financing.

Scattering inquiries for galvanized sheets for South Africa, India, China, Cuba and the Philippines is an interesting feature as the home market drags.

In the tube trade, with merchant demand still halting, two line contracts have been taken—10 miles of 6-in. pipe for the Greensboro Natural Gas Company in Pennsylvania and five miles of 10-in. for the Oklahoma Natural Gas Company.

Pig-iron production fell off in September, the total being 1,882,577 tons or 62,753 tons a day, against 1,995,261 tons, or 64,363 tons a day in August. There was a net loss of 11 furnaces and the capacity active October 1 was 60,427 tons a day, the smallest since July, 1911. Merchant furnaces turned out 16,409 tons a day in September, which is their smallest rate in three years.

Pig-iron stocks increased last month and the putting out of furnaces has not yet reached its limit.

British makers of ferromanganese have reduced their price from $80 to $68 at Baltimore, but there is no buying, and at the present low rate of steel production anxiety about the future supply has disappeared.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous.

	Oct. 7, 1914.	Sept. 30, 1914.	Sept. 2, 1914.	Oct. 1, 1913.
Pig Iron, Per Gross Ton:				
No. 2 X, Philadelphia...	$14.75	$14.75	$14.75	$16.00
No. 2, Valley furnace...	13.00	13.00	13.00	14.00
No. 2 Southern, Cin'ti...	*12.90*	13.25	13.25	14.25
No. 2, Birmingham, Ala.	10.00	10.00	10.00	11.00
No. 2, furnace, Chicago*	13.00	13.00	13.50	15.00
Basic, del'd, eastern Pa.	14.00	14.00	14.00	15.25
Basic, Valley furnace....	13.00	13.00	13.00	14.00
Bessemer, Pittsburgh....	14.90	14.90	14.90	16.65
Malleable Bess., Ch'go*..	13.00	13.00	13.50	15.00
Gray forge, Pittsburgh...	13.65	13.65	13.65	14.40
L. S. charcoal, Chicago..	15.75	15.75	15.75	15.25
Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh..	*20.50*	21.00	21.00	24.00
O.-h. billets, Pittsburgh..	*20.50*	21.00	21.00	24.00
O.-h. sheet bars, P'gh...	*21.50*	22.00	22.00	25.00
Forging billets, base, P'gh.	26.00	26.00	26.00	30.00
O.-h. billets, Phila.....	23.40	23.40	23.40	25.00
Wire rods, Pittsburgh...	26.00	26.00	26.50	27.00
Old Material, Per Gross Ton:				
Iron rails, Chicago.....	11.25	11.25	12.00	14.00
Iron rails, Philadelphia..	14.00	14.00	14.00	17.50
Carwheels, Chicago	10.75	10.75	11.25	12.25
Carwheels, Philadelphia..	*10.50*	11.00	11.50	13.00
Heavy steel scrap, P'gh.	11.00	11.00	11.25	12.00
Heavy steel scrap, Phila..	*10.25*	10.50	10.50	11.75
Heavy steel scrap, Ch'go.	8.50	8.50	9.50	10.00
No. 1 cast, Pittsburgh...	11.50	11.50	11.50	12.75
No. 1 cast, Philadelphia.	*11.50*	12.00	12.00	13.50
No. 1 cast, Ch'go (net ton)	9.00	9.00	9.50	10.50
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia..	1.12	1.12	1.15	1.32½
Iron bars, Pittsburgh....	1.15	1.15	1.20	1.55
Iron bars, Chicago.....	*1.00*	1.05	1.07½	1.35
Steel bars, Pittsburgh....	*1.15*	1.20	1.20	1.40
Steel bars, New York....	*1.31*	1.36	1.36	1.56
Tank plates, Pittsburgh.	*1.15*	1.20	1.20	1.40
Tank plates, New York..	1.31	1.31	1.36	1.56
Beams, etc., Pittsburgh..	*1.15*	1.20	1.20	1.40
Beams, etc., New York..	*1.31*	1.36	1.36	1.56
Skelp, grooved steel, P'gh	1.15	1.15	1.20	1.35
Skelp, sheared steel, P'gh	1.20	1.20	1.25	1.45
Steel hoops, Pittsburgh..	*1.25*	1.30	1.30	1.60
Sheets, Nails and Wire, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh.	1.95	1.95	1.95	2.05
Galv. sheets, No. 28, P'gh	2.95	2.95	2.95	3.10
Wire nails, Pittsburgh...	1.60	1.60	1.60	1.65
Cut nails, Pittsburgh....	1.60	1.60	1.60	1.55
Fence wire, base, P'gh...	1.40	1.40	1.40	1.45
Barb wire, galv., P'gh...	2.00	2.00	2.00	2.05

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Coke, Connellsville, Per Net Ton at Oven:	Oct. 7, 1914.	Sept. 30, 1914.	Sept. 2, 1914.	Oct. 1, 1913.
Furnace coke, prompt...	$1.60	$1.60	$1.70	$2.15
Furnace coke, future....	1.75	1.75	1.75	2.25
Foundry coke, prompt...	2.00	2.00	2.20	2.90
Foundry coke, future....	2.15	2.15	2.35	3.00

Metals, Per l.b. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	*12.00*	12.25	13.00	16.62½
Electrolytic copper, N. Y.	*11.62½*	11.75	12.37½	16.50
Spelter, St. Louis.....	*4.80*	5.00	5.90	5.45
Spelter, New York.....	*4.95*	5.15	6.05	5.60
Lead, St. Louis.....	*3.37½*	3.57½	3.72½	4.50
Lead, New York.....	*3.50*	3.75	3.87½	4.65
Tin, New York.....	30.87½	30.87½	38.00	40.75
Antimony, Hallett's, N. Y.	**12.00**	10.00	14.00	7.75
Tin plate, 100-lb. box, P'gh.	$3.30	$3.30	$3.60	$3.50

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh, in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail. The rate via New York and the Panama Canal on plates, shapes, etc., is 46c.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.15c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturer's standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under ¼ in. to and including 3-16 in....	.10
Gauges under 3-16 in. to and including No. 8....	.15
Gauges under No. 8 to and including No. 9....	.25
Gauges under No. 9 to and including No. 10...	.30
Gauges under No. 10 to and including No. 12..	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles 3 ft. in diameter and over.....	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.15c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in., on one or both legs.	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909....	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting to lengths 3 ft. and over.

Wire Products.—Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.40; galvanized, $1.80. Galvanized barb wire and fence staples to jobbers, $2; painted, $1.60. Wire nails to jobbers, $1.60. Woven wire fencing, 73 per cent. off list for carloads; 72 off for 1000-rod lots; 71 off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.55	$1.60	$1.65	$1.70	$1.80	$1.90	$2.00	$2.10
Galvanized ...	2.00	2.00	2.05	2.10	2.20	2.30	2.70	2.80

Wire Rods.—Bessemer, open-hearth and chain rods, $26 to $26.50.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from April 20, 1914, and iron pipe from June 2, 1913, all full weight:

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛, ¼ and ⅜...	73	52½	⅛ and ¼.....	66	47
½	77	66½	⅜	65	46
¾ to 3.....	80	71½	½	69	56
			¾ to 2½	72	61

Lap Weld

2	77	68½	1¼	56	45
2½ to 6.....	79	70½	1½	67	56
7 to 12.....	76	65½	2	68	58
13 to 15.....	53	..	2½ to 4.....	70	61
			4½ to 6.....	70	61
			7 to 12	68	55

Reamed and Drifted

1 to 3, butt.....	78	69½	1 to 1½, butt...	70	59
2, lap	75	66½	2, butt	70	59
2½ to 6, lap....	77	68½	1¼, lap	54	43
			1½, lap	65	54
			2, lap	66	56
			2½ to 4, lap....	68	59

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜....	68	57½	⅜	63	52
½	73	66½	½	67	60
¾ to 1½.....	77	70½	¾ to 1½.....	71	62
2 to 3	78	71½	2 and 2½.....	72	63

Lap Weld, extra strong, plain ends

2	74	65½	1½	65	59
2½ to 4.....	76	67½	2	66	58
4½ to 6.....	75	66½	2½ to 4.....	70	61
7 to 8	68	57½	4½ to 6.....	69	60
9 to 12	63	52½	7 to 8	63	53
			9 to 12	58	47

Butt Weld, double extra strong, plain ends

½	63	56½	½	57	49
¾ to 1½.....	66	59½	¾ to 1½	60	52
2 to 2½	68	61½	2 and 2½	62	54

Lap Weld, double extra strong, plain ends

2	64	57½	2	55	49
2½ to 4.....	66	59½	2½ to 4.....	60	54
4½ to 6.....	65	58½	4½ to 6.....	59	53
7 to 8	58	47½	7 to 8	52	42

To the large jobbing trade an additional 5 and 2½ per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from May 1, 1914, on steel and from January 2, 1914, on iron, are as follows:

Lap Welded Steel		*Standard Charcoal Iron*	
1¾ and 2 in.....	62	1½ in.	45
2¼ in.	59	1¾ and 2 in.....	49
2½ and 2¾ in.....	65	2¼ in.	45
3 and 3¼ in.....	70	2½ to 2¾ in.....	54
3½ and 4½ in.....	72	3 and 3¼ in.....	57
5 and 6 in.....	65	3½ and 4½ in.....	60
7 to 13 in.....	62	5 and 6 in.....	49

Locomotive and steamship special charcoal grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points. On standard charcoal iron tubes for desirable orders the above discounts are shaded an extra 5, and occasionally two 5's by some makers.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8	1.40 to 1.45
Nos. 9 to 10	1.45 to 1.50
Nos. 11 and 12	1.50 to 1.55
Nos. 13 and 14	1.60 to 1.65
Nos. 15 and 16	1.70 to 1.75

Box Annealed Sheets, Cold Rolled

	Cents per lb.
Nos. 10 and 11	1.60 to 1.65
No. 12	1.60 to 1.65
Nos. 13 and 14	1.65 to 1.70
Nos. 15 and 16	1.70 to 1.75
Nos. 17 to 21	1.75 to 1.80
Nos. 22 and 24	1.80 to 1.85
Nos. 25 and 26	1.85 to 1.90
No. 27	1.90 to 1.95
No. 28	1.95 to 2.00
No. 29	2.00 to 2.05
No. 30	2.10 to 2.15

Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11	1.95 to 2.00
No. 12	2.05 to 2.10
Nos. 13 and 14	2.05 to 2.10
Nos. 15 and 16	2.20 to 2.25
Nos. 17 to 21	2.35 to 2.40
Nos. 22 and 24	2.50 to 2.55
Nos. 25 and 26	2.65 to 2.70
No. 27	2.80 to 2.85
No. 28	2.95 to 3.00
No. 29	3.10 to 3.15
No. 30	3.25 to 3.30

Pittsburgh

PITTSBURGH, PA., October 6, 1914.

Financial conditions are hurting the steel trade more than anything else. While some reports are that the money situation is improving it is far from being satisfactory. There is nothing in sight to indicate early improvement in the steel business, and it is feared that conditions will be worse before they are better. The present situation is the worst ever known in the steel business and its allied trades. The banks are refusing loans on collaterial that under normal conditions they would be glad to accept. Reductions in salaries by the Pittsburgh Coal Company and the Westinghouse Machine Company, together with the notice given the employees by the Carnegie Steel Company of its desire to terminate its present wage scales December 31, not only indicate the force of the trade depression but also that reductions in wages in industrial plants will be made January 1. There is no doubt that if the Carnegie Steel Company reduces wages other steel companies will do so. Shipments of wire rods and wire products to Europe are heavy, most of the tonnage going to England.

Pig Iron.—W. P. Snyder & Co. report the average price of basic iron in September at $13 and of Bessemer $14, at Valley furnace, these prices having ruled since last April. However, they are purely nominal. Stocks at the furnaces that are in blast are heavy and steadily getting larger. It seems certain that a further restriction in output must come in the near future. Nominal prices are as follows: Bessemer, $14; basic, $13; malleable Bessemer, $13; No. 2 foundry, $13 to $13.50; gray forge, $12.75, all at Valley furnace, with a freight rate of 90c. a ton for Cleveland or Pittsburgh delivery.

Billets and Sheet Bars.—The market on billets and sheet bars is weak at $20 for Bessemer and open-hearth billets and $21 for Bessemer and open-hearth sheet bars, f.o.b. Youngstown. The local market is possibly 50c. a ton higher than these prices, but practically no sales are being made. Consumers are covered by contracts under which they are getting their billets and sheet bars at slightly less than the above prices. While it is not expected that any part of the British inquiry for 100,000 tons of painted corrugated sheets to build barracks for winter quarters for British soldiers will come to this country it is possible that part of the sheet bars will be rolled here and shipped to England. England is short of sheet bar capacity, and heretofore has bought from Germany. The rail and billet bureau of the Carnegie Steel Company sent orders to the mills in September for billets and sheet bars for practically the same tonnage as in August. We quote Bessemer and open-hearth billets at $20.50 and Bessemer and open-hearth sheet bars $21.50, f.o.b. Pittsburgh; Bessemer and open-hearth billets $20, and Bessemer and open-hearth sheet bars $21, f.o.b. Youngstown. If a large order came on the market these prices would be shaded. Forging billets are quoted at $26 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 to 0.60 carbon take $1 per ton extra. We quote axle billets at $24 to $25, f.o.b. Pittsburgh, depending on the order.

Ferroalloys.—Last week English makers reduced prices on 80 per cent. ferromanganese from $80 to $68, seaboard, but there has been no new buying at the lower price, nor is there likely to be. Deliveries from the other side on ferromanganese contracts are being made about as promptly as they were before the war started. The American Manganese Mfg. Company has not yet started operations at Dunbar, Pa., because of a shortage of water. We quote English 80 per cent. ferromanganese at $68, seaboard. We quote 50 per cent ferrosilicon, in lots up to 100 tons, at $73; over 100 tons to 600 tons, $72; over 600 tons, $71, delivered in the Pittsburgh district. On 10 per cent. ferrosilicon the quotation is $19; 11 per cent., $20; and 12 per cent., $21, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnace. We quote 20 per cent. spiegeleisen at $25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

Steel Rails.—The report of an inquiry from Australia for 18,000 tons of standard section rails is incorrect. This order was taken more than three months ago by the United States Steel Products Company and turned over to the Carnegie Steel Company. It has not yet been shipped out. No new orders for standard sections are being placed, and the demand for light rails is very dull. We quote standard sections at 1.25c. for Bessemer stock, and 1.34c. for open hearth. Prices on light rails are largely nominal, depending entirely on the order.

Structural Material.—New inquiry is light, but some fair-sized jobs are being placed. The McClintic-Marshall Company has taken about 6500 tons for the new Mail and Express building in New York City; the Jones & Laughlin Steel Company, 450 tons for 11 pumping stations for the Valley Pipe Line Company in various parts of California, and the Massillon Bridge & Structural Company 575 tons for a new hotel building at Akron, Ohio. The market on shapes is easier, and on desirable orders 1.15c. is being named. We quote beams and channels up to 15-in. at 1.15c. to 1.20c., depending on the order, f.o.b. Pittsburgh.

Plates.—The Cincinnati, Hamilton & Dayton car orders placed conditionally with the Cambria Steel Company, and the Mt. Vernon Car & Mfg. Company are understood to have been canceled, temporarily at least. Conditions in plates are very unsatisfactory and makers state they cannot see anything better in the near future. Car buying has stopped, and little other work is being done in which plates are used. One company in the Pittsburgh district had its two plate mills idle all of September for lack of orders. The report that the Pressed Steel Car Company had received inquiries for heavy box and gondola cars for Australia, and for specially designed all-steel cars for India, is officially denied. It has not a foreign inquiry on hand, nor has it any foreign orders on its books. Prices on plates are weak, but not enough new business is coming out to test them. We quote ¼-in. and heavier plates at 1.15c. to 1.20c., f.o.b. Pittsburgh.

Skelp.—A Youngstown mill has taken 2000 tons of sheared steel skelp for delivery to England at about the same as the domestic price. The skelp market is weak and so little new business is coming out that it is not enough to test prices. We quote: Grooved steel skelp, 1.15c.; sheared steel skelp, 1.20c.; grooved iron skelp, 1.50c., and sheared iron skelp, 1.60c., delivered to consumers' mills in the Pittsburgh district.

Wire Rods.—Inquiries for wire rods from England and several other countries are active, and some business is being closed. A sale of 2500 tons of open-hearth rods for delivery to England is reported at a price of a few cents a ton higher than for domestic trade. There is no doubt that the foreign inquiry for rods has helped a good deal to sustain the local market. We quote Bessemer, open-hearth and chain rods at $26, f.o.b. Pittsburgh, and practically this price is now being quoted on foreign inquiries.

Iron and Steel Bars.—The market on both iron and steel bars is very unsatisfactory, both from the stand-

point of new business and prices. Large consumers of steel bars have had a marked falling off in their business, and as a result their specifications are not so heavy as some time ago. The new demand for iron bars is dull, and only for small lots. None of the bar mills is running to more than 50 to 60 per cent. of capacity. We quote iron and steel bars at 1.15c. to 1.20c., f.o.b. Pittsburgh, for delivery over the remainder of the year. It is stated that some contracts for steel bars have been placed for delivery in first quarter and first half of next year at 1.20c., f.o.b. Pittsburgh, but some mills will not accept business for delivery so far ahead at this price.

Sheets.—A feature of the market is the large foreign inquiries being received, mostly for galvanized sheets from South Africa, India, China, Scotland, Cuba and the Philippines. Such sheets are used almost exclusively in those countries, owing to climatic conditions. A local sheet interest has been making regular shipments of good-sized lots of galvanized sheets to India. The domestic demand is dull, and specifications against contracts are only fair. Sheet makers realize that no business is in sight, that to make lower prices would not stimulate orders, and as a result, prices are being better maintained than for some time. Most mills are understood to be quoting 2c. for No. 28 black, and 3c. for No. 28 galvanized, but three or four mills are shading these prices from $1 to $2 a ton, depending on the order. The absolute minimum of prices on No. 28 black is 1.90c., and on No. 28 galvanized, 2.90c., but these are exceptional, the general market being 1.95c. to 2c. and 2.95c. to 3c. respectively. Box annealed sheets are 1.40c. to 1.45c., some mills holding for the higher price. We quote No. 28 black plate, tin mill sizes, H. R. and A., at 1.95c. to 2c.; Nos. 29 and 30, 2c. to 2.05c. The above prices are for carload and larger lots, f.o.b. Pittsburgh, jobbers charging the usual advances for small lots from store.

Tin Plate.—Conditions in this branch of trade are quieting down, as the end of the season is near at hand. The American Sheet & Tin Plate Company's orders and shipments of tin plate products for the nine months ended September 30 were heavier than in the same period in 1913. Very little new business is coming out. Prices range from $3.30 up to $3.50. One mill reports a sale of about 500 boxes at $3.40, and another of a fair-sized lot at $3.50. We quote 100 lb. 14 x 20 coke plates at $3.30 to $3.50 per box, and 100 lb. 14 x 20 terne plates at $3.25 to $3.40 per box, f.o.b. Pittsburgh.

Wire Products.—A feature of the market is the continued heavy foreign inquiry for wire and wire nails, and good-sized shipments are being made to England and other countries. Had it not been for the large foreign trade that has developed in wire products since the European war started, domestic prices would have been lower. Prices obtained on foreign shipments of wire and wire nails are about on a parity with those quoted for domestic trade. It is stated that all contracts for wire nails at $1.50 and plain wire at $1.30 that were not taken out prior to October 1 have been canceled, so that shipments are now on a basis of $1.55 to $1.60 for wire nails and $1.35 to $1.40 for plain wire. On new orders we quote wire nails at $1.60; plain annealed wire, $1.40; galvanized barb wire and fence staples, $2; painted barb wire, $1.60, all f.o.b. Pittsburgh, freight added to point of delivery, terms 30 days net, less 2 per cent. off for cash in 10 days. We quote steel cut nails at $1.60 to $1.65, f.o.b. Pittsburgh, in carload lots. We quote woven wire fencing at 73 per cent. off in carload lots, 72 on 1000-rod lots, and 71 on smaller lots, all f.o.b. Pittsburgh.

Nuts, Bolts and Rivets.—Some foreign inquiries for rivets are coming in, two carloads for Russia being figured on at present. Domestic demand for rivets is dull and prices are low, being less to some makers than the cost of making them. New demand for nuts and bolts is dull, and only for small lots. Several makers of nuts who have large stocks on hand are naming low prices to move them. We quote structural rivets at 1.50c. and boiler rivets at 1.60c. Discounts on nuts and bolts are as follows in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	80 and 5% off
Small carriage bolts, cut threads	80% off
Small carriage bolts, rolled threads	80 and 5% off
Large carriage bolts	75 and 5% off
Small machine bolts, cut threads	80 and 5% off
Small machine bolts, rolled threads	80 and 10% off
Large machine bolts	75 and 10% off
Machine bolts, c.p.c. & t nuts, small	80% off
Machine bolts, c.p.c. & t nuts, large	75 and 5% off
Square h.p. nuts, blank and tapped	$6.30 off list
Hexagon nuts	$7.20 off list
C.P.C. and r sq. nuts, blank and tapped	$6.00 off list
Hexagon nuts, ⅝ in. and larger	$7.20 off list
Hexagon nuts, smaller than ½ in.	$7.80 off list
C.P. plain square nuts	$5.50 off list
C.P. plain hexagon nuts	$5.90 off list
Semi-fin. hex. nuts, ½ in. or under	85, 10 & 10% off
Semi-fin. hex. nuts, ⅝ in. and larger	85 & 5% off
Rivets, 7/16 x 6½, smaller & shorter	80, 10 & 5% off
Rivets, tin plated, packages	80, 10 and 5% off
Rivets, metallic tinned, packages	80, 10 and 5% off
Standard cap screws	70, 10 and 10% off
Standard set-screws	75, 10 and 10% off

Shafting.—New demand and specifications represent only about 40 per cent. of capacity, and none of the makers is running to more than that rate, and some less. In fact, not enough new business is coming out to test prices. We quote cold-rolled shafting at 66 per cent. off in carload lots, delivered in base territory, but this price is none too strong.

Hoops and Bands.—Specifications for hoops are better, especially from the wine growers in California, who are getting their crop barreled and disposed of before the expected war tax on wines is put in effect. The new demand for bands is dull, and only for small lots. We quote steel bands at 1.15c. to 1.20c., with extras as per the steel bar card, and steel hoops at 1.25c. to 1.30c., f.o.b. Pittsburgh.

Railroad Spikes.—There is practically no new demand, and railroads are not specifying on orders placed some time ago. Two local plants are closed down this week for lack of orders, and others are running to only 30 to 40 per cent. of capacity. We quote standard sizes of railroad and boat spikes at $1.40 and small railroad and boat spikes at $1.50 per 100 lb. in carload lots, f.o.b. Pittsburgh.

Merchant Steel.—New orders are only for small lots to meet current needs, and specifications against contracts are dull. Prices are weaker than for some time. Not enough business is coming out to test prices, but on small lots for prompt shipment are about as follows: Iron finished tire, ½ x 1½ in. and larger 1.30c., base; under ½ x 1½ in., 1.45c.; planished tire, 1.50c.; channel tire, ¾ to ⅞ and 1 in., 1.80c. to 1.90c.; 1⅛ in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base.; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.25c.; soft, 3.50c.; coils, hard, 3.15c.; soft, 3.40c.; freight allowed. The usual differentials apply for lighter sizes.

Standard Pipe.—The new demand for merchant pipe is dull and only for small lots, and practically nothing is doing in casing or oil well supplies. The Republic Iron & Steel Company has taken a contract for 10 miles of 6-in. line pipe for the Greensboro Natural Gas Company in Fayette County, and the Oklahoma Natural Gas Company has placed five miles of 10-in. with a local mill. Discounts are firmly held on the small amount of new business being placed.

Boiler Tubes.—There is very little demand for locomotive or merchant tubes, and discounts are still more or less shaded, depending on the order.

Coke.—The report that the Wickwire Steel Company, Buffalo, N. Y., has placed an order with a local interest for 10,000 tons of blast-furnace coke for October shipment is incorrect. It has been getting nearly half of its supply from the by-product ovens of the Dunbar Furnace Company, Dunbar, Pa., for some time. If one of the furnaces at Dunbar be put in blast to make ferromanganese, the company would use all its by-product coke and the Wickwire Company would have to buy elsewhere the amount thus cut off. This would amount to about 300 tons per day, and an order has been given to a local coke interest for about this amount, to be shipped if that happens. The furnace at

Dunbar cannot be started, however, until a supply of water is obtained, and this may not be for some time. The local coke market is absolutely flat, there being no new inquiry. Best grades of furnace coke are being sold at $1.60 in odd lots, while some high sulphur coke has been sold at a much less price. There is no new demand for foundry coke. We quote standard makes of blast-furnace coke at $1.60 and 72-hr. foundry coke at $2 to $2.25 per net ton at oven. Figures printed by the Connellsville Courier show that the output of coke in the upper and lower Connellsville regions for the nine months of this year ended September 30 were 11,200,049 net tons, which is a reduction of 4,413,755 tons from the corresponding period of 1913. The output of coke in the upper and lower Connellsville regions for the week ended September 26 was 247,221 tons, an increase over the previous week of about 4400 tons.

Old Material.—Dealers state it is impossible to sell scrap to consumers, even at the very low prices now ruling. None of the steel mills is running to more than 50 per cent. of capacity and this has cut down the consumption of scrap. Nearly all grades are off 25c. and some as much as $1 per ton. The quotation of $10.50 on No. 1 busheling scrap in our report last week was a typographical error, and should have read $9.50. For delivery to consumers' mills in the Pittsburgh and other consuming districts that take Pittsburgh freights, dealers quote about as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	$11.00 to $11.25
Compressed side and end sheet scrap	9.50 to 9.75
No. 1 foundry cast	11.50 to 11.75
No. 2 foundry cast	10.25 to 10.50
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	8.25 to 8.50
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	12.00 to 12.25
No. 1 railroad malleable stock	10.25 to 10.50
Railroad grate bars	9.50 to 9.75
Low phosphorus melting stock	13.50 to 13.75
Iron car axles	19.00 to 19.50
Steel car axles	13.50 to 14.00
Locomotive axles, steel	20.00 to 20.50
No. 1 busheling scrap	9.50 to 9.75
No. 2 busheling scrap	6.50 to 6.75
Machine shop turnings	7.75 to 8.00
Old carwheels	11.25 to 11.50
Cast-iron borings	8.50
†Sheet bar crop ends	11.00 to 11.25
Old iron rails	13.00 to 13.25
No. 1 railroad wrought scrap	11.00 to 11.25
Heavy steel axle turnings	8.25 to 8.50
Heavy breakable cast scrap	10.75 to 11.00

†Shipping point.

Chicago

CHICAGO, ILL., October 6, 1914.

A little progress toward the return of more normal money conditions, as evidenced by a reduction of the interest rate to 6 per cent. for some classes of loans, is about the only hopeful sign in an otherwise depressing week. In connection with this prospect of easier money the other side of the picture shows a great many business interests with their affairs so liquidated as to permit cleaning up lines of credit and building up bank deposits. In this way the general situation appears to be gradually adjusting itself. In the meantime the steel mills are booking scarcely more than 10 per cent. of their normal volume of new business, and specification tonnages are being cut in half. Retrenchment has been so radical, in fact, particularly with respect to the railroads, that predictions of an equally sharp reaction are not lacking. Shapes, plates and bars are selling at the general market level of 1.33c., Chicago, although some of the smaller mills are taking plate orders on the basis of 1.10c., Pittsburgh. This concession is also reported, though with less authority, as having been made for structural tonnage. Sheets and wire, while still leaders in point of orders on the books, are moving less freely, and bookings are falling off. Prices for these products, however, are being well maintained. No improvement is apparent in the demand for pig iron, and another furnace in this district is blowing out. In the scrap market there has been some selling to consumers during the week, but of insufficient volume to prevent the appearance of still lower quotations.

Pig Iron.—The discouraging absence of inquiry for pig iron weighs more heavily with each succeeding week. Another furnace in this district is to be added to the idle list, with the blowing out of the B stack of the Northwestern Iron Company at Mayville, Wis. This leaves but four out of 12 furnaces in the Western lake district still in operation. In respect to price irregularities and the inability of the furnaces to influence their customers to accept shipments the situation is still unimproved. Quotations show no material change either in Northern or Southern iron from the the prices last named. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal	$15.75 to $16.75
Northern coke foundry, No. 1	13.50 to 14.00
Northern coke foundry, No. 2	13.00 to 13.50
Northern coke foundry, No .3	12.75 to 13.25
Southern coke, No. 1 f'dry and 1 soft.	14.50 to 14.75
Southern coke, No. 2 f'dry and 2 soft.	14.00 to 14.25
Malleable Bessemer	13.00 to 13.50
Standard Bessemer	17.00
Basic	12.75 to 13.25
Low phosphorus	20.00 to 20.50
Jackson Co. and Ky. silvery, 6 per cent.	16.90 to 17.40
Jackson Co. and Ky. silvery, 8 per cent.	17.90 to 18.40
Jackson Co. and Ky. sil'vy, 10 per cent.	18.90 to 19.40

Rails and Track Supplies.—About the only orders being received from the railroads are miscellaneous lots of carloads and less of spikes, bolts and angle bars. This market reports no rail orders of consequence for the week. We quote standard railroad spikes at 1.50c. to 1.60c., base; track bolts with square nuts, 1.90c. to 2c., base, all in carload lots, Chicago; tie plates, $25.50 to $26, f.o.b. mill, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—Orders for plain material from mill are less frequent and of more miscellaneous character as to specifications with each passing week. The Inland Steel Company accumulated sufficient tonnage during the week of idleness of its 24-in. mill to resume operations this week on a reduced schedule. The necessity of taking care of customers rather than the profit of operation appears likely to have prompted this resumption. Contracts for fabricated material reported last week aggregated only 2700 tons, of which 1285 tons is for the Union Station at Dallas, to be furnished by the American Bridge Company. The same interest will supply 125 tons for a coal conveyor for the Minnesota Steel Company. The Central States Bridge Company will fabricate 780 tons for a street bridge at Indianapolis, and the Jones & Laughlin Steel Company 275 tons for a power house at San Francisco for the Valley Pipe Line Company. The Dering Coal Company is building a tipple at West Frankfort, Ill., for which 218 tons of steel has been ordered. In Chicago the prospects for structural steel buildings seem almost normal except for the element of uncertainty as to when the erection of the structures planned can be financed. The lack of any very attractive tonnage diminishes the importance of prices, but there is now no difficulty in placing almost any business on the basis of 1.15c., Pittsburgh, and some of the mills concede that they would not turn down specifications adaptable to their rolling schedules at even lower prices. We quote for Chicago delivery of plain shapes from mill 1.30c. to 1.38c.

We quote for Chicago delivery of structural material from jobbers' stock 1.75c.

Plates.—The necessities of the mills are more apparent in plate quotations than in any other product. On such plates as can be handled to advantage only by the larger mills, the market level of 1.33c., Chicago, is pretty well maintained, but for material in a limited range of sizes within the capacity of some of the smaller mills, quotations as low as 1.10c., Pittsburgh, have been made. One lot of 900 tons of plates was sold on the 1.15c. basis, and a large Western railroad bought a few carloads at the same price. On the other hand, the weaker element of the market is illustrated

by a sale of 50 tons of lighter gauge plates at 1.10c. We quote for Chicago delivery of plates from mills, 1.28c. to 1.33c.

We quote for Chicago delivery of plates from store 1.75c.

Sheets.—Although new business is not developing as rapidly as it did in August and the early part of September, the mills appear to be holding prices with considerable steadiness and some business is still being booked on the basis of 2c. and 3c., Pittsburgh, respectively, for one-pass black and galvanized sheets. With the sharp decline in spelter which has followed the advance upon which the better prices for galvanized sheets were largely predicated, the maintenance of quotations will be increasingly difficult. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.58c.; No. 28 black, 2.08c. to 2.18c.; No. 28 galvanized, 3.08c. to 3.18c.

We quote for Chicago delivery from jobbers' stock as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.55c.; No. 28 galvanized, 3.55c.

Bars.—Bar-iron prices have again slumped to the very low level of 1c., f.o.b. mill, where the competition is severe, while the majority of the business being placed is taken at 1.05c. or less. With one exception, mills of this district are running intermittently, and operations are unprofitable. New business in steel bars is decidedly limited, and specifications are only fair. The demand for reinforcing bars, usually active at this season, in anticipation of cold weather, is dragging, in company with other lines. We quote for mill shipments as follows: Bar iron, 1c., to 1.10c.; soft steel bars, 1.33c. to 1.38c.; hard steel bars, 1.25c. to 1.30c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting 60 per cent. off.

Rivets and Bolts.—Prices quoted for bolts and screws are of necessity nominal because of the marked irregularity in quotations. There is comparatively little business. We continue to quote from mill as follows: Carriage bolts up to ⅜ x 6 in., rolled thread, 85; cut thread, 80-5; larger sizes, 80; machine bolts up to ¾ x 4 in., rolled thread, 85-5; cut thread, 85; larger sizes, 80-5; coach screws, 85-10; hot pressed nuts, square head, $6.60 off per cwt.; hexagon, $7.60 off per cwt. Structural rivets, ½ to ¼ in., 1.58c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2.20c.; boiler rivets, 2.30c.; machine bolts up to ¾ x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to ⅜ x 6 in., 75-10; larger sizes, 70-15 off; hot pressed nuts, square head, $6, and hexagon, $6.70 off per cwt.

Wire Products.—Sales offices report a steady continuance of wire tonnage and it is known that some of the independent mills are operating on heavy schedules. While some of the orders booked are for export shipment the bulk of business is for domestic consumption and reflects the more normal aspects of the agricultural districts as compared with manufacturing centers. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, $1.58; wire nails, $1.78; painted barb wire, $1.78; galvanized, $2.18; polished staples, $1.78; galvanized, $2.18, all Chicago.

Cast-Iron Pipe.—At Cleveland, Ohio, a contract for 3000 tons of pipe is to be placed, and tenders are being received at Los Angeles for 750 tons and at Pasadena, Cal., for 150 tons. The outlook for any considerable municipal pipe tonnage continues meager. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $26; 6 to 12 in., $24; 16 in. and up, $23.50, with $1 extra for gas pipe.

Old Material.—Consumers of rolling-mill scrap in this market, attracted by the exceptionally low prices, were buyers during the past 10 days in a limited way. For some, at least, this was a resumption of buying following an extended period of inaction. The buying was not sufficient to support the market in any way, largely due, no doubt, to the fact that mill operations are so limited as to result in a rapid filling of their requirements by all consumers. Sales of old material by the railroad on recent lists were at even lower prices than are quoted here. Additional railroad offerings include 2000 tons from the Wabash and about 700 tons from the Chicago, Peoria & St. Louis. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Old iron rails	$11.25 to $11.50
Old steel rails, rerolling	10.00 to 10.50
Old steel rails, less than 3 ft.	10.00 to 10.25
Old carwheels	10.75 to 11.25
Heavy melting steel scrap	8.50 to 9.00
Frogs, switches and guards, cut apart	9.00 to 9.25
Shoveling steel	8.00 to 8.50
Steel axle turnings	6.50 to 7.00

Per Net Ton

Iron angles and splice bars	$11.25 to $11.75
Iron arch bars and transoms	11.25 to 11.50
Steel angle bars	8.25 to 8.75
Iron car axles	14.25 to 14.75
Steel car axles	11.00 to 11.50
No. 1 railroad wrought	8.00 to 8.25
No. 2 railroad wrought	7.25 to 7.50
Cut forge	7.25 to 7.50
Steel knuckles and couplers	8.50 to 9.00
Steel springs	9.00 to 9.50
Locomotive tires, smooth	8.75 to 9.25
Machine shop turnings	4.50 to 4.75
Cast borings	4.75 to 5.00
No. 1 busheling	6.50 to 7.00
No. 2 busheling	5.25 to 5.50
No. 1 boilers, cut to sheets and rings	5.50 to 5.75
Boiler punchings	9.25 to 9.75
No. 1 cast scrap	9.00 to 9.25
Stove plate and light cast scrap	8.25 to 8.50
Grate bars	7.75 to 8.25
Railroad malleable	8.00 to 8.25
Agricultural malleable	7.50 to 7.75
Pipes and flues	5.50 to 5.75

Hyman Michaels & Co., Peoples Gas Building, Chicago, announce the purchase of all raw materials in stock at the plant of the Chicago Steel Products Company, which organization purchased the fabricating plant on Elston avenue formerly operated by Geo. W. Jackson, Inc. It has not been doing business for some months and the several thousand tons of shapes, plates and bars not yet fabricated will be sold in the open market.

Philadelphia

PHILADELPHIA, PA., October 6, 1914.

This market is flat in nearly all directions, but the trade is not without hope that the near future will bring a betterment. Simmered down, opinion is that buying in the United States on behalf of the nations now at war will eventually cause demand to permeate all branches of trade. Unless predictions and definite indications fail, the requirement by the armies of a multiplicity of manufactured articles into which iron and steel enter, directly or indirectly, will quicken demand from American manufacturers. Results from this direction are apt to be more quickly and forcibly felt than from foreign demand for finished and semi-finished materials. Most of the foreign inquiry of the latter kind, has not yet resulted in business, though one mill reports the sale of a few thousand tons of rods and barbed wire, the terms being cash against documents seaboard and the price only a little under the domestic quotation. Quotations on billets for export have been declared to be too high by the foreign consumers. Pig iron is extremely dull. Inquiry for bars continues light. More and better orders for plates have been received, but business is not satisfactory. Sheets continues to hold up better than other products. Structural materials are quieter. The prices of plates, bars and shapes show softness and the market cannot do otherwise than follow Pittsburgh, where 1.15c. is now general.

Iron Ore.—Except for arrivals against contracts, the ore market is without feature. In the week ended October 3 there arrived 6210 tons from Cuba and 4350 tons from New Brunswick. The arrival is reported, also, of a steamer with 7000 tons of manganese ore from Brazil.

Pig Iron.—Not in a long time have sales and inquiries been so light as they have been in this territory in the past week. Such buying as there has been involved only small quantities to meet immediate needs.

While consumers are evidently not looking ahead, there is a feeling on the part of the trade that buying of foundry iron for the first quarter of next year should begin in the near future. Prices are maintained in the absence of enough demand to afford a real test of the strength of present quotations which are as follows for standard brands for early delivery in buyers' yards in this district:

Eastern Penna. No. 2 X foundry	$14.75 to $15.00
Eastern Penna. No. 2 plain	14.50 to 14.75
Virginia No. 2 X foundry	15.30 to 15.50
Virginia No. 2 plain	15.05 to 15.25
Gray forge	13.75 to 14.00
Basic	14.00
Standard low phosphorus	21.00 to 21.50

Ferroalloys.—By direction of the English producers the quotation of 80 per cent. ferromanganese has been reduced to $68, seaboard, but this price has not stimulated any demand and very little interest is being taken by consumers. Some of the latter continue to offer to resell at concessions material which they contracted for at the $38 basis. Arrivals at this port last week total 413 tons. Recent arrivals included 20 tons of ferrosilicon and 25 tons of ferrochrome. Ferrosilicon is unchanged at $71 to $73, Pittsburgh, for 50 per cent. material.

Bars.—Domestic inquiry continues light, but specifications have been fair and September is considered to have been a good month. Additional quotations have been made on foreign business, but most independent companies have not made sales abroad as yet. Steel bars are quoted at 1.35c., Philadelphia, though a case is known where a buyer obtained a carload at 1.30c., which is nearer the market. Demand for iron bars is no better and they are still procurable at 1.12c., Philadelphia.

Plates.—Orders were a little more plentiful and a little heavier than in the preceding week, although still far from satisfactory. In the case of a representative maker in this territory production has mounted to 70 per cent. of capacity. The quotation continued at 1.35c., Philadelphia, last week, though it is no secret that in one or two instances business has been lost when this quotation was made, as the buyer could get 1.30c. A mill which has been shut down for a few weeks is resuming operations today on accumulated orders.

Structural Material.—In a general way the market is quieter than it was a week ago, and mill operations are slowing up. Bids were submitted yesterday from many directions on the material and erection of repair shops for the Lehigh & New England Railroad Company at Pen Argyl, Pa. Between 750 and 800 tons will be required. Makers quote 1.30c. to 1.35c., Philadelphia, on plain material.

Billets.—With quotations unchanged at $23.40 for open-hearth rolling billets and forging steel $4 to $5 a ton higher, billets continue extremely dull. In some cases where quotations were submitted on inquiry from abroad the answer was that the price was too high, though it was stated that the foreign consumer might have to come to it.

Sheets.—The demand for sheets is about the only really bright spot in this territory, inasmuch as current orders are sufficient to maintain the full rate of production. The demand is coming from a multiplicity of sources, but does not run far ahead. Quotations are unchanged at 1.60c. to 1.65c., Philadelphia, for No. 10 blue annealed.

Coke.—The market is quiet at unchanged quotations, $1.70 to $1.75 per net ton at oven for prompt furnace coke and $2.25 to $2.35 for prompt foundry. Freight rates to this city from the principal producing districts are as follows: Connellsville, $2.05; Latrobe, $1.85 and Mountain, $1.65.

Old Material.—There is practically no buying and in some cases shipments on contracts previously entered are being held up. Prices are, therefore, largely nominal. A few reductions are noted in the quotations scheduled by dealers. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates from 35c. to $1.35 per gross ton, are as follows:

No. 1 heavy melting steel	$10.25 to $10.50
Old steel rails, rerolling	12.00 to 12.50
Low phosphorus heavy melting steel scrap	14.00 to 14.50
Old steel axles	14.00 to 14.50
Old iron axles (nominal)	18.00 to 18.50
Old iron rails	14.00 to 14.50
Old carwheels	10.50 to 11.00
No. 1 railroad wrought	12.00 to 12.50
Wrought-iron pipe	10.00 to 10.50
No. 1 forge fire	8.50 to 9.00
Bundled sheets	8.50 to 9.00
No. 2 light iron	5.00 to 5.50
No. 2 busheling	8.00 to 8.50
Machine shop turnings	8.25 to 8.50
Cast borings	8.50 to 8.75
No. 1 cast	11.50 to 12.00
Grate bars, railroad	8.00 to 8.50
Stove plate	8.50 to 9.00
Railroad malleable	9.00 to 9.50

Buffalo

BUFFALO, N. Y., October 6, 1914.

Pig Iron.—Shipments on contracts keep up remarkably well taking into consideration the general stagnation in many lines of trade, and are of even larger volume than for the first week of September. Some small lot business from New England points has been done, but the tonnage of new business placed from the Buffalo district proper has been very small. There are indications that foundries may soon be busier and one of the large local foundry and machine companies is now running night and day on special work. It is understood that the remaining active stack of the Tonawanda Iron & Steel Company, furnace A, will be blown out as soon as the present stock of ore is used up, which will be within a month. There has been no change in prices, and we quote as follows, f.o.b. furnace, for last half delivery:

No. 1 foundry	$13.00 to $13.50
No. 2 X foundry	12.75 to 13.25
No. 2 plain	12.75 to 13.00
No. 3 foundry	12.75
Gray forge	12.50 to 12.75
Malleable	12.75 to 13.25
Basic	13.50 to 14.00
Charcoal, regular brands and analysis	16.25 to 17.25
Charcoal, special brands and analysis	20.50

Finished Iron and Steel.—Specifications continued heavy up to a few days ago on expiring third-quarter contracts taken at prices under the present market. Prices are being firmly maintained at 1.20c. for bars, plates and shapes, largely because selling agencies believe a reduction at the present time would not stimulate demand and because mill costs are higher than several months ago on account of larger percentage of overhead, with reduced operations. It is estimated that the actual cost of production under present conditions is between $1 and $2 per ton more than when mills were operating around 75 to 80 per cent. of capacity. Canadian business is also very quiet, but considerable inquiry is reported for export business outside of Canada, and quite a large amount of business for shipment abroad has been placed. The Lackawanna Steel Company has an order for 4000 tons of steel reinforcing bars from the Argentine Republic to be used on public works. The Eastern Concrete Steel Company, Buffalo, was low bidder for the Cornell University drill hall, and the Durolithic Company, Buffalo, low bidder at $60,000 for the 1100 tons of structural steel required. Bids are being taken this week for 250 tons for the Nazareth Academy, Rochester, and 150 tons for armory for Troop I, Buffalo, will soon be in the market. Lupfer & Remick, Buffalo, have contract for lift bridge over the Erie, West Genesee street, Syracuse, taking 125 tons. The Lackawanna Bridge Company has 500 tons for a coal and coke handling plant for the Lehigh Coke Company at Bethlehem, Pa.

Old Material.—Business has been of small aggregate. The principal demand continues to be for borings and turnings, with some business being done in heavy melting steel. Car wheels, while not largely in demand, are scarce, one local consumer being in the market for a considerable tonnage. Prices are approximately the same as for last week, with the exception of No. 1 railroad wrought and cast scrap, and iron

axles, which are 25c. to 50c. per ton lower, and old iron rails, which are about $1 per ton lower. We quote dealers' selling prices as follows per gross ton, f.o.b. Buffalo:

Heavy melting steel	$10.25 to $10.50
Low phosphorus steel	14.00 to 14.50
Boiler plate sheared	11.50 to 12.00
No. 1 railroad wrought scrap	9.50 to 10.00
No. 1 railroad and machinery cast	10.00 to 10.50
Old steel axles	12.00 to 12.50
Old iron axles	17.00 to 17.50
Old carwheels	10.50 to 11.00
Railroad malleable	9.00 to 9.50
Machine shop turnings	5.50 to 6.00
Heavy axle turnings	7.50 to 8.25
Clean cast borings	6.00 to 6.50
Old iron rails	11.25 to 11.50
Locomotive grate bars	9.00 to 9.50
Stove plate (net ton)	9.00 to 9.75
Wrought pipe	7.50 to 8.00
Bundled sheet scrap	6.25 to 6.50
No. 1 busheling scrap	8.25 to 8.75
No. 2 busheling scrap	5.75 to 6.25
Bundled tin scrap	10.50

Cincinnati

CINCINNATI, OHIO, October 7, 1914.—(*By Wire.*)

Pig Iron.—The Southern freight rate change is still a vexing question. As far as known here, no urgent complaints have yet been made, and shippers of Southern iron are busily engaged in diverting shipments over routes that enable them to take advantage of the recent 35c. reduction from the Birmingham district. It appears to be the general belief that the Northern railroads that were not ordered to participate in the reduced rate will soon make arrangements of their own accord to meet competition to points affected, as they are losing a considerable tonnage, even at the present restricted consumption. Business continues to be confined to carload lots of foundry iron, and order books make a very poor showing, both as to new business and as to the small tonnages checked out for shipment on old contracts. Stocks are slowly deceasing in the Ironton district, as the production of foundry iron there is practically at a standstill, but in the South stocks are accumulating. Only tentative inquiries have been made for first-quarter delivery, and many of these are from consumers who are behind in taking iron already overdue. The redeeming feature of the situation is the hopeful feeling of most manufacturers, who believe that a change for the better is at hand. Several local machine-tool builders are letting contracts for heavy castings to fill foreign orders received lately. The only general inquiry of note is from Michigan, calling for 1000 tons of foundry iron for delivery during the next six months. Based on freight rates of $2.90 from Birmingham and $1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft	$13.40 to $13.90
Southern coke, No. 2 f'dry and 2 soft	12.90 to 13.45
Southern coke, No. 3 foundry	12.40 to 12.90
Southern No. 4 foundry	11.90 to 12.40
Southern gray forge	11.40 to 11.90
Ohio silvery, 8 per cent. silicon	17.20 to 17.70
Southern Ohio coke, No. 1	15.20 to 15.70
Southern Ohio coke, No. 2	14.20 to 14.70
Southern Ohio coke, No. 3	13.95 to 14.20
Southern Ohio malleable Bessemer	14.20
Basic, Northern	14.45 to 14.95
Lake Superior charcoal	15.25 to 17.25
Standard Southern carwheel	26.90 to 27.40

(*By Mail*)

Coke.—There is a little new foundry business, but shipments overdue on old contracts will offset this slight gain many times. A very few small sales are also reported of both 48-hr. and 72-hr. brands for domestic uses; the demand from this source is considerably below normal, attributable to some extent to the mild weather. Gas coke is also dragging. Pocahontas quotations on both 48-hr. and 72-hr. coke are practically the same for prompt shipment—$2 to $2.25 per net ton at oven—with about 25c. a ton more asked for special brands. As low as $1.75 could possibly be done on some furnace coke. Connellsville furnace grades are quoted at $1.70 to $1.85 for either prompt or last-quarter shipment. Foundry coke is quiet around $2.25 for any shipment this year.

Finished Material.—While there is generally a hopeful spirit among both mill agencies and jobbers the past week's trade has been quite light. Reinforcing concrete rods are in some demand. The sheet mills report a steady run of new small orders for prompt shipment, but it is understood that specifications on old contracts have shown a slight falling off. The mills in this territory are holding to quotations of 2.15c., Cincinnati, for No. 28 black sheets, and 3.15c. for No. 28 galvanized sheets. Store prices on steel bars and light structural shapes are unchanged around 1.80c. to 1.85c. Hoops and bands are moving slowly. Jobbers supplying the outside hardware trade state that the call for wire products of almost every kind was fairly good in September.

Old Material.—It is not believed that the reduction in pig-iron freight rates to Cincinnati proper will have any effect on the present prices of scrap iron. Correct average quotations are now almost impossible to obtain. Both the yards of sellers and buyers contain very large stocks, and with the exception of the comparatively small users of scrap there is no demand from any consuming source. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices at yards:

Per Gross Ton

Bundled sheet scrap	$6.25 to $6.75
Old iron rails	11.00 to 11.50
Relaying rails, 50 lb. and up	19.75 to 20.25
Rerolling steel rails	10.00 to 10.50
Melting steel rails	8.75 to 9.25
Old carwheels	9.75 to 10.25

Per Net Ton

No. 1 railroad wrought	$8.00 to $8.50
Cast borings	4.00 to 4.50
Steel turnings	4.00 to 4.50
Railroad cast scrap	9.25 to 9.75
No. 1 machinery cast scrap	10.00 to 10.25
Burnt scrap	6.00 to 6.50
Old iron axles	14.50 to 15.00
Locomotive tires (smooth inside)	9.25 to 9.75
Pipes and flues	6.00 to 6.50
Malleable and steel scrap	7.00 to 7.25
Railroad tank and sheet scrap	5.00 to 5.50

Cleveland

CLEVELAND, OHIO, October 6, 1914.

Iron Ore.—Shipments from Lake Superior for September amounted to 5,438,049 gross tons, making the total movement up to October 1, 26,716,158 tons. The September movement was 431,000 tons less than that of August and 1,812,000 tons less than that of September, 1913. Shipments will fall off materially this month. Some ore firms will finish shipments next week and quite a number of ore boats are being laid up for lack of cargoes. The indications now are, as predicted a few weeks ago, that the total shipments for the season will not reach 32,000,000 tons, as compared with water shipments of slightly over 49,000,000 tons in 1913. We quote prices as follows: Old range Bessemer, $3.75; Mesaba Bessemer, $3.50; old range non-Bessemer, $3.00; Mesaba non-Bessemer, $2.85.

Pig Iron.—The only sales reported are a few small lots of foundry iron for prompt shipment, and there are no inquiries of any size pending. Conditions in the foundry tradé show little change, although a few factories that make a specialty of automobile work are busier than they were. Shipments on contracts are holding up fairly well. Price quotations are unchanged, but there have been no orders recently of sufficient size to test the market. We quote, delivered Cleveland, as follows:

Bessemer	$14.90
Basic	$13.75 to 13.90
Northern No. 2 foundry	13.75
Southern No. 2 foundry	14.00 to 14.25
Gray forge	13.25
Jackson Co. silvery, 8 per cent. silicon	17.55
Standard low phosphorus, Valley furnace	20.50

Coke.—We note the sale of 50 cars of standard furnace coke for prompt shipment at $1.60 per net ton at oven. However, lower prices are being quoted on coke not strictly standard. There are no inquiries for contracts. Standard Connellsville foundry coke is quoted at $2.25 to $2.50 per net ton at oven.

Finished Iron and Steel.—The demand is very light in all finished lines. The Cleveland interest that recently purchased a round tonnage of steel bars for the first half has also bought 5000 tons of forging billets for the same delivery, this business being divided among several mills. The contract price was a good current market price with no premium added by reason of the

future delivery. There is no positive confirmation of reports that a 1.15c. price is being named for prompt shipment. The leading mills claim to be adhering to the 1.20c. price, but some makers are remitting the usual $1 a ton extra charge for twisting for reinforcing purposes. Hard steel bars are lower, now being quoted at 1.15c. for desirable orders. Steel bands are being offered at 1.15c. Bar iron is in light demand and continues weak. Western mills are taking Ohio orders at 1.02½c. and this price can probably be shaded. We quote iron bars for Cleveland delivery at 1.15c. to 1.20c. The structural market is quiet. Several building contracts are pending, but the only work placed is for small lots. The Jones & Laughlin Steel Company has taken 150 tons for the Humane Society building, Toledo, and a 150-ton contract has been placed for a high school, Ashtabula. J. F. Casey, Pittsburgh, was the low bidder for work in connection with a Cleveland pumping station requiring about 450 tons of steel piling. Specifications are coming from the automobile trade in somewhat better volume. One order from this source is for over 900 tons of steel bars. The sheet market is dull and prices are not firm. There was considerable shading by jobbers who had low-priced contracts that expired October 1 and some of the mills are naming low prices. While the general quotation is 2c. for No. 28 black and 3c. for No. 28 galvanized, these prices are being shaded $1 to $2 a ton for prompt shipment, and sales of galvanized sheets are reported at lower than 2.90c. The city of Cleveland will receive bids October 7 for 3245 tons of cast iron pipe, 258 tons of castings and 129 tons of valve boxes. Warehouse prices are 1.80c. for steel bars and 1.90c. for plates and structural material.

Bolts, Nuts and Rivets.—The demand for bolts and nuts is light and prices are being shaded. Rivet specifications have improved and are fairly good. Prices are unchanged at 1.50c. for structural and 1.60c. for boiler rivets. We quote discounts as follows: Common carriage bolts, ⅜ x 6 in., smaller or shorter, rolled thread, 80 and 20 per cent.; cut thread, 80 and 15 per cent.; larger or longer, 75 and 15 per cent.; machine bolts with h. p. nuts, ⅜ x 4 in., smaller or shorter, rolled thread, 80 and 25 per cent.; cut thread, 80 and 20 per cent.; larger or longer, 80 per cent.; coach and lag screws, 80 and 25 per cent.; square h. p. nuts, blank or tapped, $6.30 off; hexagon h. p. nuts, blank or tapped, $7.20 off; c. p. c. and t. square nuts, blank or tapped, $6 off; hexagon, ⅝ in. and larger, $7.20 off; 9/16 in. and smaller, $7.80 off; semi-finished hexagon nuts, ⅝ in. and larger, 85, 10 and 5 per cent.; 9/16 in. and smaller, 85, 10, 10 and 5 per cent.

Old Material.—With an abundance of scrap offered and little demand, the market is weaker and the little tonnage that is moving is going at very low prices. Heavy melting steel scrap is a drug on the market and is freely offered at $10.75 for Sharon and the Valley delivery and it is reported that some material has been offered at $10.50 without takers. Most mills are well supplied and will not buy additional scrap at any price. A number of producers who have been selling only to consumers are now selling to dealers who are taking on a limited tonnage to fill contracts. Borings and turnings are in better demand than other grades and prices on these are holding up fairly well. Railroad malleable is lower. The Pennsylvania Lines West will receive bids October 7 on a round tonnage. We quote, delivered Cleveland, as follows:

Per Gross Ton

Old steel rails, rerolling	$11.50 to $12.00
Old iron rails	12.50 to 13.00
Steel car axles	13.25 to 13.75
Heavy melting steel	9.50 to 10.00
Old carwheels	10.75 to 11.00
Relaying rails, 50 lb. and over	23.00 to 25.00
Agricultural malleable	8.50 to 9.00
Railroad malleable	9.75 to 10.00
Light bundled sheet scrap	7.50 to 8.00

Per Net Ton

Iron car axles	$17.00 to $17.25
Cast borings	5.75 to 6.00
Iron and steel turnings and drillings	5.25 to 5.50
Steel axle turnings	6.75 to 7.25
No. 1 busheling, new	8.25 to 8.50
No. 1 busheling, old	8.00 to 8.25
No. 1 railroad wrought	9.50 to 10.00
No. 1 cast	10.25 to 10.50
Stove plate	7.50 to 8.00

Birmingham

BIRMINGHAM, ALA., October 5, 1914.

Pig Iron.—Manufacturers and brokers not only report practically no sales but the receipt of many requests to hold up shipments, due to slackening operations at foundries. The requests come from a great variety of trade. Pig iron is accumulating. One company especially well sold into the future piled 6000 tons of foundry pig iron in its yards in September, and other foundry makers added to their stocks in proportion. A large amount of basic has also been stocked. Disposition to blow out furnaces is on the increase, with no action yet taken except in the case of one stack of the leading interest which has been running on basic at Ensley. Two producers report sales of 50 per cent. of their make in September. This is the maximum. The one redeeming feature is that furnace interests are pretty well sold up. One has orders to capacity for the rest of the year; another for two months' full operations. The railroads affected by the lower freight rates ordered by the Interstate Commerce Commission are credited with exerting influence to have the non-conformists fall into line. The iron operators have taken no formal action but are preparing for it. An example of the manner in which consuming centers are affected by the non-conforming railroads is the State of Michigan, in which only one point gets the benefit of the reduced rate. It is understood that one charcoal furnace at Shelby, which has been idle for eight months, is to resume. We quote, per gross ton, f.o.b. Birmingham furnaces, as follows:

No. 1 foundry and soft	$10.50 to $11.00
No. 2 foundry and soft	10.00 to 10.50
No. 3 foundry	9.50 to 10.00
No. 4 foundry	9.25 to 9.75
Gray forge	9.00 to 9.50
Basic	10.00 to 10.25
Charcoal	23.50 to 24.00

Cast Iron Pipe.—Southern pipe makers have not been very successful in recent biddings on sizable contracts, margins on which, it is understood, have been close. However, water pipe is being manufactured at about 85 per cent. capacity. The sanitary pipe shops at Gadsden have shut down for a stated period of 10 days owing, it is declared, to the stagnant condition of the trade. The closed plants are the Coosa, Campbell and Gadsden. The Dixie Pipe Company, Gadsden, has been finally incorporated with Robert Campbell president and a capital stock of $40,000. A sanitary pipe factory will be erected. Trade is generally dull. We quote, per net ton, f.o.b. yards, as follows: 4-in., $20; 6-in. and upward, $18, with $1 added for gas pipe.

Coal and Coke.—Operators of collieries report a maximum of 50 per cent. operations. The leading producer is keeping forces intact by alternate colliery working. Domestic yards appear to have about filled for the early part of winter. Railroads are consuming much less coal, owing to the decrease in freight traffic. Foundries are taking less coke on account of slackening operations. The small output is not readily taken. We quote, per net ton, f.o.b. oven, as follows: Furnace coke, $2.75 to $3; foundry, $3.25 to $3.50.

Old Material.—Outside of machine cast and stove plate the scrap dealers report a decided dearth of business. The prospect is uncertain. Quotations are nominal. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles	$14.50 to $15.00
Old steel axles	14.50 to 15.00
Old iron rails	13.00 to 13.50
No. 1 railroad wrought	10.00 to 11.00
No. 2 railroad wrought	8.50 to 9.00
No. 1 country wrought	9.00 to 10.00
No. 2 country wrought	8.00 to 9.00
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	8.00 to 8.50
Tram carwheels	9.50 to 10.00
Standard carwheels	10.50 to 11.00
Stove plate	8.00 to 8.50

It is stated that the stock of copper in Germany is ample for the military requirements. The stock of lead at the German works is fairly large, and there is a good supply of ore. Spelter has not changed much in price, and there is no possibility of scarcity, owing to the large German production.

Boston

BOSTON, MASS., October 6, 1914.

Old Material.—Dealers report little change, except that signs of increasing confidence are more numerous. Transactions are few; in fact, there is nothing upon which to base prices. Probably the present figures are shaded in some sales to consumers and in some purchases from producers. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are approximately 50c. per ton more than dealers' prices.

Heavy melting steel	$8.50 to	$8.75
Low phosphorus steel	13.75 to	14.75
Old steel axles	13.25 to	13.75
Old iron axles	21.25 to	21.75
Mixed shafting	12.00 to	12.25
No. 1 wrought and soft steel	9.00 to	9.25
Skeleton (bundled)	5.50 to	5.75
Wrought-iron pipe	8.00 to	8.25
Cotton ties (bundled)	6.25 to	6.50
No. 2 light	3.75 to	4.25
Wrought turnings	5.00 to	5.50
Cast borings	5.25 to	5.75
Machinery cast	11.25 to	11.50
Malleable	8.00 to	8.25
Stove plate	7.75 to	8.00
Grate bars	5.25 to	5.50

St. Louis

ST. LOUIS, MO., October 5, 1914.

The disturbance over the pig-iron rates from Birmingham, Ala., reduced by order of the Interstate Commerce Commission, has been accentuated by the definite refusal of the Burlington, the Chicago & Alton and the Rock Island to participate in the reduction, leaving it to the Southern roads to carry the entire effect of the order. In consequence a large number of pig-iron consuming points are affected to the north, northwest and west of St. Louis. Definite steps are being taken to present the matter to the Interstate Commerce Commission again as quickly as possible to relieve a situation which may militate against Southern iron in areas which have competition in Northern iron.

Pig Iron.—Transactions continue to be of the carload lot order and for the most part for special analysis iron for particular needs. The foundries are reported as running about 50 per cent. of capacity and a considerable number are said to be utilizing to a great extent No. 1 machine cast scrap, which gives an advantage of $2 to $2.50 per ton compared with No. 2 iron.

Coke.—Purchases are at the minimum with by-product coke dull at a delivered price on the Connellsville basis plus $2.80 freight.

Finished Iron and Steel.—About the only structural contract of size was 265 tons for the Missouri Pacific viaduct at Atchison, which went to a Minneapolis erector. Specifications under contracts expiring September are reported to have been up to the amount signed up for, indicating a willingness to hold ordered material for future use. The movement out of warehouse is reasonably fair, and the quotations ruling are as follows: Soft steel bars, 1.70c.; structural steel, 1.80c.; tank plates, 1.80c.; No. 10 blue annealed sheets, 2c.; No. 28 box annealed, cold rolled sheets, 2.55c.; No. 28 galvanized sheets, black sheet gauge, 3.55c.

Old Material.—The scrap market continues stagnant with really not enough business doing to establish prices. Such buying as is being done is by dealers for unloading purposes. There is some little demand for No. 1 machine cast scrap from foundries which can use it in place of No. 2 Southern foundry iron at present favorable prices, but not enough to create any specially notable movement or stiffening of prices. Lists out this week include 100 tons from a local industry, 900 tons from the Mobile & Ohio, 200 tons from the St. Joseph & Grand Island and 1000 tons from the Frisco. We quote dealers' prices, f.o.b. St. Louis, as follows:

	Per Gross Ton	
Old iron rails	$10.50 to	$10.75
Old steel rails, rerolling	10.75 to	11.00
Old steel rails, less than 3 feet	10.00 to	10.25
Relaying rails, standard section, subject to inspection	21.00 to	23.00
Old carwheels	10.50 to	10.75
No. 1 railroad heavy melting steel scrap	9.50 to	9.75
Shoveling steel	7.50 to	8.00
Frogs, switches and guards cut apart	9.50 to	9.75
Bundled sheet scrap	4.50 to	4.75
	Per Net Ton	
Iron angle bars	$9.50 to	$10.00
Steel angle bars	8.25 to	8.50
Iron car axles	16.25 to	16.75
Steel car axles	11.25 to	11.75
Wrought arch bars and transoms	10.50 to	11.00
No. 1 railroad wrought	7.50 to	7.75
No. 2 railroad wrought	7.50 to	7.75
Railroad springs	8.75 to	9.00
Steel couplers and knuckles	8.25 to	8.75
Locomotive tires, 42 in. and over, smooth	8.25 to	8.75
No. 1 dealers' forge	7.25 to	7.75
Mixed borings	3.50 to	3.75
No. 1 busheling	6.75 to	7.00
No. 1 boilers, cut to sheets and rings	5.25 to	5.75
No. 1 cast scrap	9.00 to	9.50
Stove plate and light cast scrap	7.75 to	8.25
Railroad malleable	7.50 to	7.75
Agricultural malleable	7.00 to	7.50
Pipes and flues	5.25 to	5.75
Railroad sheet and tank scrap	5.25 to	5.50
Railroad grate bars	6.75 to	7.00
Machine shop turnings	4.50 to	4.75

New York

NEW YORK, October 7, 1914.

Pig Iron.—The rate of foundry operations remains about the same, but there is little new inquiry of consequence. In New Jersey one buyer has asked for 1200 tons of foundry iron for November and December delivery, equally divided between No. 2 plain and a high silicon iron. The same foundry has made its first purchase of malleable pig iron in the past week. Heretofore its castings of this description have been made on contract. Another New Jersey melter is in the market for 750 tons of foundry grades. From New England reports are a trifle more encouraging, though in spots. The better demand for woolens and worsteds has been felt in textile machinery lines and such New England establishments as have had orders recently from the countries at war, largely on government account, have added their contribution to the somewhat better feeling in that district. It appears that Buffalo furnaces are not having uniform experiences with the foundry trade. Several large buyers have held up shipments on pig iron from Buffalo, but in a number of cases smaller foundries have urged forward shipments. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, $14.75 to $15; No. 2 X, $14.25 to $14.50; No. 2 plain, $14 to $14.25. Southern iron is quoted at $14.75 to $15 for No. 1 and $14.25 to $14.50 for No. 2.

Ferroalloys.—The English producers of 80 per cent. ferromanganese have reduced the price to $68, seaboard, for sales that may be made from now to the end of the year. This is a cut of $12 from the market price of the last few weeks. But there is no inquiry and the market is dead. Deliveries on contracts are reported to be satisfactory and in some cases beyond the needs of the consumers, owing to the unsatisfactory state of their order books. It is good opinion that there is no immediate likelihood of a scarcity. Rumors are heard of a desire on the part of some consumers, well supplied with the alloy, to sell a part of their supply, but actual sales were not confirmed. The Steel Corporation does not now seem to be a factor in the market. Quotations for 50 per cent. ferrosilicon remain at $71 to $73, Pittsburgh, according to the tonnage sold.

Finished Iron and Steel.—With the pronounced dullness, prices are weak. While recently prevailing quotations are still made, it is freely admitted that an attractive tonnage in bars, shapes or plates will bring concessions. There are unconfirmed rumors of 1.15c., Pittsburgh basis, being done for structural material, while most of the small amount of plate business going is at 1.15c., Pittsburgh, with some instances of a basing at 1.20c. at the mill instead of Pittsburgh, bringing an advantage of 40c. per ton to the buyer over 1.15c. Pittsburgh. The week is nearly devoid of large lettings,

although at this writing about 4000 tons is about ready to be decided. Eidlitz & Ross are reported to have the 900 tons for the Orthopædic Hospital. To be added to recent lists of projects pending may be mentioned 500 tons for the Union National Bank, Scranton, on which the general contract has been placed, and 500 tons for a high school at Allentown, Pa. The loft building at Broadway and Thirty-fifth street will take 2700 tons. Some bar iron makers report a fair run of orders and prices continue to show a wide range among mills, at least as high as 1.30c. at mill, and the higher price quoted below has been accepted for some last quarter contracts. We quote mill shipments of steel bars and shapes at 1.20c., Pittsburgh, or 1.36c., New York, steel plates at 1.31c. to 1.36c. New York, and iron bars at 1.25c. to 1.30c., New York. For lots from store we quote iron and steel bars at 1.80c. to 1.85c., New York, and plate and structural material at 1.85c. to 1.90c.

Cast-Iron Pipe.—The Department of Water Supply, Gas and Electricity of this city will open bids tomorrow (Thursday) on 195 tons of 8-in. pipe for Brooklyn. Municipal lettings are now few and far apart. Salem, Mass., is purchasing some small quantities of pipe required for immediate use, but the city authorities have taken no action yet regarding the very large quantity needed for next spring. Inquiries from private buyers are plentiful and considerable quantities are being purchased in this way. The continued dry and mild weather is enabling pipe laying to be done under exceptionally favorable conditions for the season. Export business is receiving much attention from pipe manufacturers but the financial question presents a formidable obstacle to the closing of contracts by South American buyers. It is understood that 1000 tons has been sold to go to Havana, Cuba. An inquiry for 4000 tons for Santa Clara, Cuba, is expected to get in shape for closing at an early day. Carload lots of 6-in. are quoted at $20 to $20.50 per net ton, tidewater.

Old Material.—Little new business has been placed recently in this market. Consumers of steel scrap show but slight interest, rolling mills are making no inquiries and foundries appear to be getting along without buying scrap. An inquiry for a considerable quantity of cast scrap was in the market last week but it is understood to have been withdrawn. The market is becoming weaker. Stocks of scrap in this vicinity are abundant while railroad lists are unusually heavy. The whole situation would seem to indicate that values will be forced considerably lower. The railroads are obliged to dispose of their old material, as it gets in the way and must be moved and besides the companies need the money. Dealers' quotations are nominally as follows, per gross ton, New York:

Old girder and T rails for melting	$7.75 to $8.25
Heavy melting steel scrap	7.75 to 8.25
Relaying rails	20.00 to 20.50
Rerolling rails	9.50 to 10.00
Iron car axles	15.00 to 15.50
Steel car axles	11.50 to 12.00
No. 1 railroad wrought	9.50 to 10.00
Wrought-iron track scrap	9.00 to 9.50
No. 1 yard wrought, long	8.25 to 8.75
No. 1 yard wrought, short	8.00 to 8.50
Light iron	3.25 to 3.50
Cast borings	6.25 to 6.50
Wrought turnings	6.00 to 6.25
Wrought pipe	8.00 to 8.50
Carwheels	9.50 to 10.00
No. 1 heavy cast, broken up	10.25 to 10.75
Stove plate	7.75 to 8.25
Locomotive grate bars	6.50 to 7.00
Malleable cast	7.50 to 8.00

Some British Lines Better

Large Orders for Horseshoes—Sales of American Billets—Dominion Sells Wire Products

(*By Cable*)

LONDON, ENGLAND, October 7, 1914.

A little more is being done in finished iron. Very large orders for horseshoes have been placed for home use and for France. Finished steel is quieter. The galvanized sheet trade is poor and prices are weak. America is reported to have booked a small line of oil sizes of tin plates for Japan. American Bessemer billets have been sold at 98s. ($23.85), c. i. f., Glasgow. The Dominion Steel Company is selling wire rods here at £6 12s. 6d. ($32.23), c.i.f., Liverpool; also wire nails at 8s. 6d. ($2.07) basis. Pig iron keeps quiet, with price changes trifling, but stocks are increasing steadily. Deliveries of pig iron are greatly below normal but are better than in August. Stocks in Connal's stores are 104,110 gross tons, against 103,012 tons last week. The active blast furnaces in all three districts are 156, against 191 a year ago. Such quotations as are available are as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 12s. 9d. ($3.10).

Cleveland pig iron warrants (Tuesday), 50s. 6½d. ($12.30), against 50s. 11d. ($12.39) last week.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 51s. ($12.41), against 51s. 3d. ($12.47) last week.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 5s. ($45.01).

Steel ship plates, Scotch, delivered local yards, £7 ($34.06).

Steel rails, export, f.o.b. works port, £6 5s. ($30.41).

Hematite pig iron f.o.b. Tees, 66s. 6d. ($16.18), against 66s. 9d. ($16.24), last week.

Sheet bars (Welsh), delivered at works in Swansea Valley, £5 2s. 6d. ($24.94).

Steel joists, 15 in., export, f.o.b. Hull or Grimsby, £6 12s. 6d. ($32.23).

Steel bars, export, f.o.b. Clyde, £7 2s. 6d. ($34.67).

Metal Market

NEW YORK, October 7, 1914.

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York			Lead		Spelter	
Sept.	Lake	Electrolytic	Tin, New York	New York	St. Louis	New York	St. Louis
30	12.00	11.75	31.00	3.75	3.60	5.10	4.95
Oct.							
1	12.00	11.75	31.05	3.70	3.55	5.10	4.95
2	12.00	11.75	31.12½	3.70	3.55	5.00	4.85
3	12.00	11.75	.....	3.70	3.55	5.00	4.85
5	12.00	11.62½	31.00	3.60	3.45	5.00	4.85
6	12.00	11.62½	30.87½	3.50	3.37½	4.95	4.80

Copper buying continues light and quotations are lower. On one day only was there good buying of tin and quotations have changed but little. Lead has again been reduced, following keen competition. The demand for spelter is light and prices are lower. Demand from abroad has caused antimony to take a turn upward.

New York

Copper.—The aggregate of the spotty business which has been done is light. In electrolytic, prices vary somewhat. It is understood that one producer is not quoting specifically, although it has been intimated that 12c., full terms, would be accepted. Another producer, however, will take business at 11.75c., full terms, which is equal to 11.62½c., cash, New York. Lake is quoted at 12c. to 12.25c., though there is a limited quantity of prime Lake to be had at the lower figure. While the quantity is not large it is more than sufficient to meet present demand. Exports this month total 3245 tons and the prospects are that exportation will be lessened, now that England will prevent neutral nations from receiving more copper than they may need for their own purposes.

Copper Averages.—The Waterbury average for the month of September was 12.87½c. The average New York price for Lake, based on daily quotations in *The Iron Age*, was 12.67½c., and for electrolytic, on the same authority, 12.05½c.

Tin.—The market has been dull except on Monday when probably 200 tons, mostly for future delivery, was dealt in. There is considerable interest on the part of consumers in future metal and provided they could get it at their figure a good volume of business would result. What they are willing to pay, however, is too low to be considered by the sellers. There is an ample supply here which is rather tightly held, but the situation will be easier in this respect next week when there will be some heavy arrivals from London. The New York quotation

yesterday was 30.87½c. The arrivals this month total 345 tons and there is afloat 2885 tons.

Lead.—The zeal of independent producers in going after what small business there was caused the American Smelting & Refining Company to reduce its prices October 5 to 3.60c., New York, and 3.45c., St. Louis, and again to-day, to 3.50c., New York, making the St. Louis quotation 3.37½c. Since that time there has been a little more inquiry and buying, but, all told, it has not been heavy.

Spelter.—Though exports in September amounted to about 17,000 tons, foreign demand has now fallen off almost completely and this, together with the dull domestic business, has caused prices to decline to 4.95c., New York, and 4.80c., St. Louis. Unless conditions change, the trade is of the opinion that curtailment of production will be inevitable.

Antimony.—On the strength of an inquiry from abroad, and rumors that England had instructed agents to ship metal back to that country, prices advanced sharply yesterday. Cookson's was quoted at 13c.; Hallett's at 12c.; Chinese and Hungarian at 11c. to 12c., and some dealers named prices 2c. per lb. higher. It is known that some antimony was shipped back to Europe. It is used in a mixture with lead for the contents of shrapnel shells.

Old Metals.—The market continues quiet. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible	11.75 to 12.00
Copper, heavy and wire	11.25 to 11.50
Copper, light and bottoms	10.25 to 10.50
Brass, heavy	8.50 to 8.75
Brass, light	6.25 to 6.50
Heavy machine composition	11.00 to 11.25
Clean brass turnings	8.00 to 8.25
Composition turnings	9.00 to 9.50
Lead, heavy	3.50
Lead, tea	3.25
Zinc scrap	4.00

Chicago

OCTOBER 5.—While there has been considerable buying of copper the market has at no time gotten away from the disposition to shade quotations. Prices have been in a measure nominal and without quotable change from last week. The market for tin has been unusually quiet. Some consideration is being given to the possibility of limitation in the supply of antimony, and its price has firmed up somewhat for that reason. We quote as follows: Casting copper, 12.25c.; Lake copper, 12.50c., for prompt shipment; small lots, ⅛c. to ¼c. higher; pig tin, carloads, 31.75c.; small lots, 33.75c.; lead, desilverized, 3.65c. to 3.72½c., and corroding, 4.10c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.05c. to 5.10c.; Cookson's antimony, 14c. for cask lots; other grades, 10c. to 11c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 11c.; copper bottoms, 9.75c.; copper clips, 10.25c.; red brass, 10c.; yellow brass, 7.50c.; lead pipe, 3.30c.; zinc, 3.50c.; pewter, No. 1, 23c.; tinfoil, 27c.; block tin pipe, 29c.

St. Louis

OCTOBER 5.—The market for nonferrous metals has been rather dull and prices have fallen off somewhat. To-day's quotations are as follows: Lead, 3.55c.; spelter, 4.90c.; tin, 33.50c.; Lake copper, 13c.; electrolytic copper, 12.90c.; Cookson's antimony, 11c. In the Joplin ore market the highest price reported for zinc blende was $46 per ton on an assay basis of 60 per cent. at $42. There were some sales of inferior ore as low as $30. Most of the selling was at $39. Calamine was weak at $21 to $23, with the best settlement at $27. Lead ore was dull at $46. Miscellaneous scrap metals are quoted as follows: Lead, 3c.; zinc, 3c.; tea lead, 3c.; pewter, 20c.; tinfoil, 26c.; light brass, 5c.; heavy yellow brass, 7c.; heavy red brass and light copper, 8.50c.; heavy copper and copper wire, 9.50c.

Iron and Industrial Stocks

NEW YORK, October 7, 1914.

Nothing definite has yet appeared with regard to the re-opening of the New York Stock Exchange. Transactions in bonds and stocks are taking place privately, with the result that occasionally the price realized on some securities becomes known to the public, but no authoritative quotations are yet available. It would not be surprising if the Exchange should continue closed for several weeks more.

Dividends Declared

The Harbison-Walker Refractories Company, regular quarterly, 1½ per cent. on the preferred stock, payable October 20.

The Youngstown Foundry & Machine Company, semi-annual dividend, 3 per cent., payable October 15.

The Pittsburgh Coal Company, regular quarterly, 1¼ per cent. on the preferred stock, payable October 26.

The Union Switch & Signal Company, regular quarterly, $1.50 a share on the common and preferred stocks, payable October 15.

Paterson Industrial Exposition

Under the auspices of the Chamber of Commerce of Paterson, N. J., an industrial exposition is to be held in that city October 12 to 24. Silk will be the predominating feature of the exhibition, inasmuch as Paterson leads in the manufacture of that commodity, but the various other industries of the city will be represented also. Manufacturers of silk machinery in six different States have arranged to display their machines, which will illustrate the manufacture of silk from the earliest stages to finishing the product. The exposition will open with a military, civic and industrial parade which is to be reviewed by Governor James F. Fielder of New Jersey.

A paper on the counter current principle as applied to directly fired and to waste heat boilers appeared in the August number of the Journal of the Engineers' Society of Pennsylvania. It discusses at some length the conditions under which fuel economizers should be installed and those under which the use of waste heat boilers is economical. The conclusions drawn by the author, George H. Gibson, George H. Gibson Company, New York City, are that economizers can be used profitably regardless of the fuel price and load factor, as if an economizer is not installed the boiler must heat the water up to the evaporation point at a lower efficiency, since it contains water at the temperature of steam, while the economizer utilizes the low initial temperature of the water to increase the heat absorption. Waste heat boilers and turbines should be put in for as high steam pressures as are practical, in view of other considerations, and the boiler should be supplemented by an economizer to obtain the maximum amount of power from a given amount of gases.

Heat treating in the plant of the Burroughs Adding Machine Company, Detroit, is now done in a new building of reinforced concrete, 55 x 130 ft. in plan. Ten new furnaces have been added to the equipment, comprising seven for carbonizing by the cyanide of potassium process, or for lead hardening; one for heating or annealing in melted barium chloride; one for black oxidizing and one for carbonizing, this using service gas as a carbonizing agent as well as a fuel.

The offices of the Harbison-Walker Refractories Company, heretofore located in the Turley Building, Portsmouth, Ohio, are being removed to the company's plant in the East End. L. C. Turley is general manager of the company.

The Standard Mfg. Company, Shelby, Ohio, has moved into a new fireproof plant, 50 x 180 ft., largely increasing its former capacity. The company manufactures sash locks, drawer pulls, spring floor hinges and checking hinges.

The Falls Hollow Staybolt Company, Cuyahoga Falls, Ohio, which will erect a rolling mill and muck mill, has placed the engineering contract for the building of its new plant with Walter Rachals & Co., engineers, Youngstown, Ohio.

Book Review

Iron Ores: Their Occurrence, Valuation and Control. By Edwin C. Eckel. Published by McGraw-Hill Book Company, New York. Price, $4.

This 425-page book is an ambitious and consistent attempt to cover the commercial and financial sides of the iron ore industry, with whatever geological and operative information may be necessary to general understanding of the main object of the work. How well the attempt has succeeded must be determined by the reader, who will bring to bear upon his judgment his own knowledge, experiences, prejudices and what breadth of outlook he may possess. Whatever he may think of some of Mr. Eckel's conclusions, he must acknowledge that the book is based upon wide information and long experience. He will be inclined to think, I take it, that the author has approached some of his chapters, notably that on the probable duration of American reserves of ore, with a good deal more assurance than can be warranted by the facts at command. Nevertheless, the book contains a great deal of valuable data, compiled from many sources, and discussed with intelligence and skill.

The author very properly devotes much space to a discussion of the sedimentary ores, such as those of Birmingham and Wabana. These ores exist in enormous quantity, but generally their potentialities have not been appreciated because of their relatively slight consumption. Mr. Eckel looks for a great growth in the use of such ores, especially those situated in the southern United States. But he fails to consider one factor in this matter; it is this: While the territory available to Birmingham producers is quite similar in square miles to those drawing steel supplies from Pittsburgh or Chicago, its industries are agricultural and its population includes a class lacking great buying power. It has neither the diversification of industry nor the consumptive requirements per capita that have made Pittsburgh and Chicago such steel centers and that have forced the Lake Superior region to contribute four-fifths of the American supply of ore. And it will take a radical change in Southern economic conditions to effect a reversal of this factor.

Mr. Eckel's belief in the future overwhelming importance of the Atlantic ore market is well stated, and coincides with the opinion of many men of affairs. Indeed, it is easy to prophesy that the time will come when miners of the interior of the United States will be far more interested in that market than they are today. Cheaper transport, such as will be afforded by the New York barge canal, is likely to bring interior ores into competition in this market, even if sound judgment would conserve them for the interior steel maker.

Referring to the beneficiation of lean ores the author states that "concentrated ores are not an important factor today in the iron industry, and except in certain areas it will be many decades before they become the leading source of supply." This quotation in itself does not mean much, but taken in connection with the author's general remarks on the subject of concentration one may assume that Mr. Eckel has no great expectation that concentration will be of particular importance within many years. Although his opinion is that of an exceptionally well informed engineer, many feel that the supply of high grade low-phosphorus American ores must be secured shortly from lean ores, and by concentration. This concentration will so increase available ores that no estimates of total reserves or of duration of reserves are worth much which do not consider these concentrable ores.

In a discussion of various attempts that have been made to estimate iron ore reserves, beginning with that of Dr. Törnebohm in 1905, Mr. Eckel pays a good deal of attention to the Hayes estimate of 1908, prepared at the suggestion of the Conservation Commission, and he states that "this report must stand as the basis for all future discussions of this subject." Just why any particular preliminary engineering guess should be taken as a basis for all future discussion, to the exclusion of other guesses, is difficult to understand, unless it recommends itself by some particularly meritorious figure. The Hayes estimate gave a total of available ores in the Southeastern section as 538 million tons (I eliminate the odd thousands as a trivial and picayune attempt at apparent precision where no precision is possible), and it gave the total for Lake Superior as 3510 million tons available. There may be so much on Lake Superior, though nobody knows it yet, and the only official figures we have are not up to 2000 million tons, even now; but there are certainly several times 538 million tons in the Southeastern region. The Northeastern estimate of 298 million tons is wide of what was known in 1908. To say that such an estimate is a basis for all discussion smacks of an obsession of professional courtesy. It is as well, sometimes, to say plainly what one thinks as to wave one's hand and murmur, "After you, Alphonse."

Mr. Eckel wisely draws attention to the fact that there will come a point in the ownership of ore reserves when they are a burden, and worth less than nothing. Most of us can recall specific cases in our own experience where such has been the fact. But it is hard to convince the layman or the banker that an iron maker may gather such extensive reserves as to swamp himself.

Chapters on origin of iron ores and their geological occurrences, together with discussions of types of deposits and the natural methods of exploring ore formations are written simply and clearly and contain much interesting information. Many pages are given of mining cost figures, in the main taken from various reports of Government investigations, to which investigations and their instigators Mr. Eckel pays his respects in no uncertain language. There is none of the gloss of professional courtesy here!

It would seem that a bibliography either should be or should not be. It must be that more than half a dozen important publications have been issued on any one of the subjects upon which Mr. Eckel prints the briefest bibliographical citations, and at that including fleeting descriptive articles published from time to time in semi-technical journals.

The book should be in the library of any man who proposes to keep up to the time in the literature of iron ores. The information it contains is well digested and in convenient form. D. E. W.

Records of New Commercial Attaches

WASHINGTON, D. C., October 7, 1914.—In view of the interest manifested by many business men in the recent appointment by the Secretary of Commerce of seven commercial attaches, which has resulted in a number of inquiries addressed to the Department as to the experience and special qualifications of the appointees, the record of each of the officials has been compiled and is presented below.

A. H. Baldwin has been appointed commercial attache to London by transfer from the position of chief of the Bureau of Foreign and Domestic Commerce. He was a student at Yale, lived two years in Paris, and since 1884 has filled important executive positions in the Government service. For the past four years he has served as chief of the Bureau of Manufactures and the Bureau of Foreign and Domestic Commerce. He has traveled extensively for the Government in the United States, Alaska, Porto Rico, Hawaii, and in European countries. He speaks French and is conversant with Spanish, German and Italian.

C. W. A. Veditz, appointed commercial attache to Paris, is a graduate of the University of Pennsylvania, where he specialized in finance and economics, and afterward did postgraduate work in economics and political science in Germany, France, Austria, Switzerland and Italy. Since the completion of his European studies, he has been alternately a college professor of economics and an expert investigator of the United States Government. For the Government he has carried on five economic investigations in Europe, relating to such subjects as child labor laws and their enforcement, foreign markets for harvesting machinery, wages and labor conditions in the textile industry and costs of production of earthenware and china. He speaks French and German fluently.

Erwin W. Thompson, appointed commercial attache at Berlin, has a degree in engineering from Cornell University, is a member of the American Society of Mechanical Engineers, and a writer on technical subjects. He speaks German and French. For many years Mr. Thompson has been actively engaged in the cotton industry of the South, his work extending from the production of cotton in the field to the cotton mill and cotton seed oil mill. He has given considerable time to mill construction. He has traveled extensively in Europe on visits to his foreign customers, and has but recently completed a year's tour undertaken for trade promotion.

Dr. Albert Hale, appointed commercial attache for Argentina, has degrees from the University of Michigan and the Northwestern University, and has taken a course of study in the University of Strassburg. He has served on the staff of the Pan-American Union since 1908 and has traveled extensively in Latin-American countries. After some experience in Mexico in the service of the Mexican International Railroad, he took a course of study at the University of Kiel, Holstein. Dr. Hale speaks German, Spanish and Portuguese.

Prof. Lincoln Hutchinson, appointed commercial attache at Rio de Janeiro, Brazil, is a graduate of the University of California, has a degree from Harvard, and studied at Leipzig. He is now associate professor of commerce and a dean in the University of California. In addition to practical commercial experience in banking houses, he has traveled widely in Europe, the Orient, Australasia, Alaska, Hawaii and Latin-America. He made a special study of trade conditions in Central and South American countries for the Department of Commerce and Labor in 1905 and 1906. He is an accomplished linguist and is the author of "The Panama Canal and International Trade Competition," now in press, and other works on commercial subjects.

A. I. Harrington, appointed commercial attache for Lima, Peru, is a graduate of Yale and has had considerable experience in railroad work in various parts of the United States. He served four years as an officer of the Philippine constabulary. In 1910 he entered the foreign sales organization of the Standard Oil Company, being stationed at Java. Subsequently he was appointed traveling agent for the company in the Dutch East Indies from which service he resigned in 1914 to go to Latin-America. Mr. Harrington speaks Spanish fluently.

Julean H. Arnold, appointed commercial attache for China, has been transferred from the position of consul general at Hankow, where he has done excellent work in trade promotion for the past 12 years. He speaks Chinese in its various dialects, and has traveled in all parts of the Chinese Republic on special commercial missions. He has been stationed at Dalny, Foochow, Shanghai and Chefoo, and has a wide acquaintance among the leading men of China.

The John B. Black Company, Chester, Pa., has been incorporated under the laws of Pennsylvania with $50,000 capital stock, for the manufacture of edge tools, cutlery, etc. The incorporators are the heirs of the late John B. Black, who succeeded H. B. Black & Co., manufacturers of the original Wm. Beatty & Son's edge tools since July 1, 1886. On this date H. B. Black, who purchased the Beatty interests in 1875, associated with him in partnership B. Frank Beatty and John B. Black. The Beatty brand of goods has been made since 1806 and has remained in the one family of Beattys and their descendants. The work will be carried on in the present plant, which is situated on Second street, Chester, on the tracks of the Philadelphia & Reading Railroad and in close proximity to the Delaware River. The line consists of cleavers, choppers, axes, hatchets, adzes, mill picks, bush hooks, hedge knives and coopers' tools. Anna R. Black is to be president of the new company; Lillian B. Swint, vice-president, and Harry B. Black, secretary and treasurer.

Philippine Iron and Steel Imports

WASHINGTON, D. C., October 7, 1914.—In view of the widespread interest in the foreign commerce of the United States at this time, the Bureau of Insular affairs has secured from Manila the customs returns for the fiscal year ended June 30, 1914. These figures show a phenomenal increase in the consumption of iron and steel products. The gain on the previous year was more than 50 per cent. The total Philippine imports of all classes of merchandise for 1914 were valued at $56,011,570, which was $316,013 below the total for 1913, while the exports were valued at $51,238,048, or about $2,500,000 less than the total in 1913, which was the largest in the history of the islands. Notwithstanding the slight falling off in total imports, the value of goods imported from the United States rose from $25,387,085 to $28,571,821, from which it appears that for the first time more than one-half the imports for a full fiscal year were received from the United States. During the same period the imports from the United Kingdom declined from $5,652,880 to $5,229,702, while those from Germany rose from $2,744,835 to $3,327,952. Japan, however, outranked Germany in 1914, her share of the Philippine imports being $3,856,662 as compared with $2,756,508 in 1913. The United States absorbed 47 per cent. of the exports of the Philippines in 1914, the total taken by this country being $22,047,105, as compared with 37 per cent. in 1913, when the total taken was $19,848,885.

The development of the sugar industry in the Philippines has given a decided impetus to the imports of sugar machinery of all kinds, including power plants of various types. Corrugated roofing, also largely used by the sugar mills of the islands, was the next most important item of iron and steel imports. The following table shows the total imports of the principal articles of the metal schedule for the fiscal year 1914 as compared with 1913, together with the share of the United States and of the principal competing countries:

Articles	1913	1914
Machinery	$2,591,539	$3,665,352
United States	1,553,605	2,169,562
United Kingdom	653,333	585,600
Corrugated roofing	642,928	1,090,867
United States	585,493	943,486
United Kingdom	56,866	144,478
Other sheets and plates	214,876	378,987
United States	183,725	332,257
United Kingdom	15,507	35,920
Rails	325,432	720,654
United States	271,995	547,165
Germany	43,571	158,392
Structural iron and steel	233,896	713,929
United States	168,548	671,158
United Kingdom	45,503	28,693
Germany	18,424	2,115
Bars and rods	361,606	436,620
United States	249,402	241,103
Belgium	36,189	80,392
United Kingdom	51,092	58,675
Germany	20,320	45,760
Pipes and fittings	320,140	363,827
United States	238,218	329,027
Germany	73,917	12,356
United Kingdom	7,681	22,140
Wire and manufactures of	252,029	255,878
United States	189,398	195,489
United Kingdom	28,143	30,708
Germany	23,416	33,984
Tools	247,612	252,206
United States	176,447	171,487
Germany	33,903	34,265
United Kingdom	26,552	34,669
Nails, spikes and tacks	126,392	181,585
United States	98,457	142,661
Germany	10,509	13,291
Enameled utensils	160,037	145,726
United States	5,542	6,883
Germany	78,975	78,776
Austria Hungary	55,542	33,841
Cutlery	108,513	119,381
United States	62,183	59,313

Officials of the Bureau of Insular Affairs express the opinion that if American manufacturers will devote a little study to the Philippine industries employing iron and steel products, they will rapidly acquire a much larger percentage of this business. Consumers there have certain preferences to which English, German and Belgian manufacturers have carefully catered, but American goods are rapidly increasing in popularity and only minor concessions are necessary to secure more of the business. W. L. C.

Co-operation in Export Trade in Steel

No Organized Action Under Present Conditions — Foreign Trade Convention in St. Louis—Coming Pan-American Conference

Co-operation in Extending Export Trade in Steel

Publication has been made in the past week of statements credited to officers of independent steel companies, to the effect that the independent manufacturers are to co-operate with the United States Steel Corporation in the extension of the country's export trade in steel products. Unwarranted inferences are likely to be drawn from these publications. *The Iron Age* finds no indication of any different status of the export steel trade than has existed heretofore. It is hardly to be expected that the Steel Corporation, with its thorough organization for export trade built up in the past ten or twelve years, would entertain the idea of working with other companies which have no such organization. It is not at all likely, moreover, with the dissolution suit pending, that any steps would be taken which had even the appearance of a resumption of the policy of "co-operation" on which the Government has laid stress in the prosecution of this suit.

Nothing more tangible apparently exists as a foundation for the publications on this matter made in the past week than the fact that both the Steel Corporation and one independent steel company are represented on the National Foreign Trade Council, whose members are from various industries and lines of trade. As has been noted more than once in these columns, there is a movement on foot for such an amendment of the Clayton bill as will permit companies in the same business to join their forces in pushing export trade, where no single company could maintain an organization for that purpose. If sentiment accumulates in favor of such permission being granted, the independent steel companies might carry out a plan that has been agitated for some time, to have joint representation in certain foreign markets. With the Trade Commission in existence such co-operation would be possible, with the oversight of that body, and the public properly safeguarded against any extension of the co-operation to the domestic trade. Some such aid to the increase of the country's exports of steel and many other products may be and ought to be the outcome of the serious thought now being given to this problem.

Foreign Trade Notes

Exports of merchandise from the port of New York for the week ending Saturday, October 3, were valued at $13,270,365, as compared with $20,032,132 in the preceding week, and $14,561,782 in the corresponding week of 1913. In the first three weeks of September those exports were $12,210,000, $13,906,000 and $17,208,000 respectively, and the average in August was about $11,000,000 a week. The falling off in the past week from the preceding week of heavy exports may have been because the $20,000,000 movement was due to unusual and temporary influences.

President James A. Farrell of the United States Steel Corporation, who is chairman of the National Foreign Trade Council, has prepared a leaflet on "The War and South American Trade," which the council is about to distribute. It is issued "in the hope of correcting prevalent misconceptions regarding the trade of the United States with South America." After emphasizing the necessity for the improvement of certain fundamental conditions before existing trade can be handled, "saying nothing of greater business in the future," the paper discusses with great clearness the characteristics of South American trade, the influence of the war, reduced buying power, European investments, possibility of United States investments, banking facilities, disadvantages of the manufacturers of the United States and other phases of the subject.

The Sandusky, Ohio, plant of the Libbey Glass Company is reported to have an order from London for 500,000 bulbs to be used in making incandescent lamps.

The Algoma Steel Corporation, Sault Ste. Marie, Ontario, has orders for steel in connection with shell contracts placed in Canada for the British artillery.

The Foreign Trade Committee of Philadelphia has been organized in the past week, James M. Dodge of the Link Belt Company, being made chairman. There are fifty-five members. A committee will be appointed to report on the various subjects to be investigated. These include a proposed Latin-American Trade Convention in Philadelphia, a Philadelphia Expedition to South America, the establishment of information bureaus in the large centers of Latin-America, agreement upon a method of meeting the demand for long credits in South America and a study of the raw products of South America with a view to finding a larger market for them in Philadelphia.

American Prices Must Be Right

The following is an extract from a letter recently received by Voigt, Davis & Co., Inc., exporters, 25 Beaver street, New York, from one of their important connections on the West Coast of South America, the writer carrying on a large business in which he represents six prominent American manufacturing companies:

"I am afraid this war is going to last longer than we all think and there will be very little chance for me to get goods from Germany for some time. Certainly you know that especially in the ———— line Germany furnishes a whole lot of merchandise. I am now going over our whole stock and I am making a list of things which so far I have not been able to get from the States. I am noting down all particulars with each article, and I believe that you will be able to show the American manufacturers what is wanted here. If they are smart they will at once take advantage of this and go to work to manufacture what is absolutely necessary for the South American markets.

"Certainly the American manufacturer must come down in price, if he wants to maintain the trade, after Germany is ready again to supply this market. That is important.

"I shall be very glad to hear from you what chances there are to get these goods from the States. I am an American and naturally I want to protect my country, but it is all a question of price."

The Coming Pan-American Congress in Chile

WASHINGTON, D. C., October 7, 1914.—Work preliminary to the drafting of instructions for the guidance of the United States delegates to the fifth Pan-American Conference to be held in Santiago, Chile, November 29, has been begun by the State Department and the Department of Commerce, with co-operation by the Pan-American Union, and the administration is making every effort to secure results that will be of the highest value to the business men of this country, and especially to those seeking to extend their trade with Latin America. Although these conferences in the past have been designed to improve the trade relations between the United States and Central and South America, no great accomplishments in this direction have been recorded, and the work has usually taken a diplomatic rather than a commercial trend.

The delegates from the United States to the San-

tiago Conference will be instructed to keep constantly in view three important aims: First, to convince the representatives of our Central and South American neighbors of the friendliness of this government and of the desire of the administration to cultivate the closest business as well as diplomatic relations; second, to obtain in the fullest detail practical, up-to-date suggestions for the extension of our trade in Latin America, including both import and export branches; and, third, a study of the financial condition of the principal countries of South and Central America together with their respective banking systems, this information to be gathered with a view to its usefulness to United States bankers desiring to establish branches in Latin America to finance the trade of this country, both present and prospective.

The Mexican war has proved an unfortunate episode from a commercial as well as a diplomatic standpoint and much has been made by commercial rivals of the United States in South America of the alleged hostile attitude of this country toward Mexico. It will be an important duty of our delegates to neutralize this work, and to convince the Pan-American countries that the United States to-day stands ready to do everything in its power to bring about in Mexico not only peace but the complete industrial and commercial rehabilitation of that country.

So many conflicting suggestions regarding opportunities for the extension of our export trade in Latin America, and the best methods of pushing it, have been received by the Departments here both from their own agents and from business men more or less experienced in this trade, that the administration believes that much important work can be done at the coming conference in sifting these suggestions and separating those which are sane and timely from those which are the outgrowth of inexperience or over-zeal. The existing tariff act, while not specifically designed to increase our trade with South America, provides important reductions in rates on some leading South American products, a fact that will not be lost sight of by our delegates to Santiago. The suggestions that have recently reached the Department of Commerce and the Treasury Department to the effect the provisions of the new currency act authorizing the establishment of banks in South and Central America are inadequate will be carefully inquired into and it is possible that, as the result of the coming conference, recommendations for the amendment of the law may be made to Congress early in the coming session.

The list of delegates to represent the government at Santiago has not yet been completed, but the names now under consideration include men of distinguished public service and wide experience in diplomacy and prominent men of business.

National Foreign Trade Convention at St. Louis in January

WASHINGTON, D. C., October 7, 1914.—The first meeting of the Latin-American Trade Committee, recently appointed by Secretary of Commerce Redfield, in compliance with a resolution adopted at the conference of September 10 on Latin-American trade, was held at the New Willard Hotel on Friday, October 2. James A. Farrell, chairman of the National Foreign Trade Convention, was elected chairman of the committee. He introduced Secretary Redfield, who addressed the committee and subsequently took an active part in its deliberations in executive session.

The chief feature of the meeting was the presentation and adoption of a report embodying the conclusions of an investigation of the South American trade problem made by the committee since its creation. This report, which was accepted after discussion as "the committee's view of sound commercial policy for the systematic development of improved trade relations in the western hemisphere," will later be made public for the benefit of the business men of the country. The committee adjourned subject to an early call by Chairman Farrell. Those present included Robert Rose, trade adviser of the State Department; John Barrett, director general of the Pan-American Union; J. P. Grace, of W. R. Grace & Co., New York; Fairfax Harrison, president Southern Railway; W. E. Peck, president of W. E. Peck, New York; Clarence J. Owens, managing director of the Southern Commercial Congress; Willard Straight; W. D. Simmons, president E. C. Simmons Hardware Company, St. Louis, and E. P. Thomas, president United States Steel Products Company. Members of the committee representing Chicago, Philadelphia, Boston, San Francisco and other sections were unable to attend. After the meeting Chairman Farrell, on behalf of the National Foreign Trade Council, issued the following call for a second National Foreign Trade Convention to be held in St. Louis next January:

> In view of the entire country's realization that sound and systematic extension of our foreign commerce is vital to the prosperity of every citizen, it is important that all elements should take counsel. Under the authority conferred upon it by the National Foreign Trade Convention, held at Washington last May and attended by 400 representatives of nearly 100 commercial and industrial organizations, the National Foreign Trade Council now calls a second National Foreign Trade Convention, to be held at St. Louis on January 21 and 22, 1915.
>
> Since national unity of action and co-operation are necessary to meet the existing emergencies, retain the trade we have and gain a greater share of world commerce, invitations will be issued to all commercial and industrial, transportation and financial organizations interested in the subject. It is expected that they will send delegates to this accessible meeting place for a practical business men's conference on ways and means firmly to build for the future of the over-seas commerce of all sections of the United States.

Secretary Redfield has agreed to co-operate in the work of the St. Louis convention and will probably detail several of the trade experts of the Department of Commerce to assist the National Council. W. L. C.

Enlistments from British Industrial Plants

Late English engineering papers give some interesting sidelights on the numbers of working forces of industrial plants as affected by the European war. Up to September 11, for example, 118 men from the works and offices of the Westinghouse Brake Company, Ltd., had joined the British army, representing 28 per cent. of the normal establishment. The company is paying these men half-rate wages, and has agreed that all who return on the expiration of the service will find their places open for them. The employees of Siemens Brothers Dynamo Works enlisted to the number of 400 and the firm is arranging to keep the posts of all these men open, provision being made meanwhile for their dependents. Some 852 employees of the British Thomson-Houston Company, Ltd., Rugby, about 50 per cent. of the eligible number, have enlisted at half wages.

Hans Renold, Ltd., Manchester, has formulated the following distinction between employees drawing $12.50 per week or less and those drawing more than $12.50. In the former case full pay will be given to married men for the first four weeks after enlistment, to be followed by half-pay until the conclusion of the war. In the event of the man being killed the allowance will be continued to his dependents until the end of the war, or until any pension available can be obtained. Every man who joins the army will be guaranteed employment on his return, as far as possible the same position that he had occupied being kept open; if this is impossible, then another position will be found. In the case of the men in the receipt of salaries higher than $12.50 per week, and also in the case of single men with dependents, special consideration will be given to each case. The case of those who take commissions from the first will be individually considered. In the event of universal service coming into force, the allowances will only apply to those who had voluntarily enlisted.

From the works and offices of the British Westinghouse Electric & Mfg. Company, Ltd., Manchester, 700 men have joined the army.

OBITUARY

Joseph Fawell

Joseph Fawell, president of Mackintosh, Hemphill & Co., formerly the Fort Pitt Foundry, Pittsburgh, died at his home October 1 after a long illness, aged 60 years. He was born at Sadberge, Durham, England, in which country he received his early education and training as a mechanical engineer. In 1878 he came to this country and a year later entered the employment of Mackintosh, Hemphill & Co. as chief draftsman. His ability as a designer of rolling-mill equipment was soon recognized, and a short time later he was appointed chief

JOSEPH FAWELL

engineer, in charge of the drafting room and pattern shop. He remained in that capacity until 1902, when he was elected president of the company to succeed N. A. Hemphill, retired. Mr. Fawell was regarded in the iron and steel world as one of the foremost authorities in rolling-mill practice, and he was closely identified with the progress of that industry in this country. There are few American rolling mills or steel works of prominence in which there cannot be found some machinery which has been designed under his supervision. He leaves a widow, two daughters and one son, Joseph E. Fawell, of Mackintosh, Hemphill & Co.

EDWARD RILEY, who had been identified with the steel industry of Great Britain for many years, died September 12, aged 83 years. He was intimately associated with the early experiments on the Bessemer process at the Dowlais Iron Works. Later he carried on extensive investigations in the use of titaniferous iron ores. In the early eighties he began experiments on basic open-hearth furnace linings, and took out a patent for the use of crude petroleum oil and tar as a binder for use with burnt lime or dolomite. This was found so satisfactory that he conveyed his patent to the proprietors of the basic process for a share in the basic patents, and in this way became intimately associated with the basic or Thomas-Gilchrist process. In May of this year he was presented with the Bessemer Gold Medal at the meeting of the Iron and Steel Institute.

CHARLES C. BURNHAM, Pawtucket, R. I., president Eaton & Burnham Machine Company, died September 27, aged 88 years. He was born in Maine and went to Pawtucket as a young man. He was identified with the banking business of Pawtucket for more than a half-century, serving as a trustee of the Franklin Savings Bank, which was absorbed by the Slater Trust Company in 1901, and was a member of the first council elected following the incorporation of Pawtucket. He leaves a widow, three sons and a daughter.

GEORGE T. WARWICK, vice-president and general manager of the International Machine & Screw Company, Springfield, Mass., died September 27, aged 62 years. He was the inventor and manufacturer of the old Warwick bicycle and certain bicycle parts that had much to do with the perfecting of the modern bicycle. Of late years he had devoted his time to the developing of screw machines.

JOHN CHRISTIAN EDWARD STOLP, for many years engaged in the manufacture of wire in New York City, died September 29 at his home in Brooklyn, aged 75 years. He leaves two sons and a daughter.

THOMAS BURNS, Newark, N. J., founder of the Thomas Burns & Son Iron Works, died September 27, aged 92 years. He leaves a widow and one son.

JULY EXPORTS AND IMPORTS

Iron and Steel Tonnage Exports Less Than Half Those a Year Ago

The total value of our iron and steel exports for July, as reported by the Bureau of Foreign and Domestic Commerce, shows a falling off of 30.7 per cent. from the value for the same month last year. This is a greater difference than for the previous two months—June, 25 per cent. and May, 26.2 per cent. Our bill for foreign goods, however, was only 10 per cent. less than for July, 1913. The total value of the exports of iron and steel and manufactures thereof, not including iron ore, was $16,737,552 against $18,927,958 in June, $19,734,045 in May and $24,170,704 in July, 1913. Corresponding figures for imports were $2,772,662 in July, $2,835,110 in June, $2,835,290 in May and $3,080,883 in July, 1913.

The exports of commodities for which quantities are given totaled 114,790 gross tons in July, as compared with 143,953 tons in June, 139,110 tons in May and 237,160 tons in July, 1913. Wire rods, cut nails and steel sheets, which for the two months previous showed an increase over corresponding months in 1913, fell off noticeably and are for this month less than for July last year. Hoops and bands, and especially tin and terne plates, are greater than for July a year ago.

Details of the exports of these tonnage commodities in July and the seven months ended with July, compared with the same periods of the previous calendar year, are as follows:

Exports of Iron and Steel

	July		Seven months	
	1914, gross tons	1913, gross tons	1914, gross tons	1913, gross tons
Pig iron	9,371	18,361	80,381	165,624
Scrap	3,642	7,076	27,493	59,074
Bar iron	556	1,407	2,763	9,929
Wire rods	347	3,574	38,381	47,198
Steel bars	8,164	13,207	67,744	135,429
Billets, ingots and blooms, n.e.s.	2,955	5,831	29,899	77,696
Bolts and nuts	1,280	1,841	10,017	13,488
Hoops and bands	846	781	5,775	11,043
Horseshoes	82	122	700	771
Cut nails	335	444	2,812	2,186
Railroad spikes	813	1,086	4,704	7,661
Wire nails	2,474	4,523	18,215	28,048
All other nails, including tacks	212	291	1,605	2,469
Pipes and pipe fittings	17,332	25,048	121,819	190,590
Radiators and cast-iron house heating boilers	253	619	2,089	5,053
Steel rails	9,550	56,233	119,235	287,858
Galvanized-iron sheets and plates	3,103	7,617	24,771	52,756
All other iron sheets and plates	823	2,013	5,351	16,832
Steel plates	7,172	22,178	71,460	149,891
Steel sheets	9,663	10,797	82,324	77,236
Structural iron and steel	14,388	37,604	118,316	248,514
Tin and terne plates	8,213	3,435	34,762	40,519
Barbed wire	7,074	6,514	42,894	44,610
All other wire	6,142	6,558	46,315	70,647
Totals	114,790	237,160	959,825	1,744,522

In July the imports of commodities for which quantities are given totaled 24,958 gross tons, 37 per cent. less than July, 1913, when 39,694 gross tons were imported, but greater than June, 1914, when they amounted to only 23,075 tons. Most of the loss in imports over a year ago is in pig iron and scrap, although there are noticeable losses in bar iron, structural iron and steel, billets, wire rods, and particularly tin and terne plates. On the other hand, steel rails and sheets and plates are larger than for July, 1913.

Details of the imports of tonnage commodities in July and the seven months ended with July, compared with the corresponding periods of the previous calendar year, are as follows:

Imports of Iron and Steel

	July		Seven months	
	1914, gross tons	1913, gross tons	1914, gross tons	1913, gross tons
Pig iron (including ferrosilicon)	.....	16,404	.....	98,124
Ferrosilicon	623	.....	3,473	.....
All other pig iron	11,526	.....	70,390	.....
Scrap	3,056	9,218	18,882	34,888
Bar iron	3,001	3,947	11,818	19,143
Structural iron and steel	671	1,760	6,150	7,912
Ingots, blooms and steel billets	.....	2,482	.....	13,930
Steel billets without alloys	216	.....	1,507	.....
All other steel billets	3,395	.....	24,480	.....
Steel rails	1,236	575	9,270	3,510
Sheets and plates	486	402	2,850	2,138
Tin and terne plates	342	3,648	13,070	15,236
Wire rods	406	1,258	5,320	10,594
Totals	24,958	39,694	96,820	205,475

Imports of iron ore in July were 141,838 gross tons, against 272,017 tons in July, 1913. For seven months ended with July, 1913, the imports were 850,883 tons, against 1,408,170 tons in the corresponding period last year.

The total value of exports of iron and steel and manufactures thereof in the seven months ended with June, 1914, was $129,816,916, against $179,703,554 in the corresponding period of last year, while the figures for imports were respectively $18,752,973 and $20,872,324.

Pittsburgh Manganese Ore Company

The Pittsburgh Manganese Ore Company, organized a few months ago by some Pittsburgh capitalists, has its office in the Farmers' Bank Building in that city. It bought a tract of manganese ore property near Elkton, W. Va., containing 140 acres, and has since leased 150 acres. In the last few months it has been mining about two cars, or 100 tons, of manganese ore per week. A good part of the output has been shipped to the Carnegie Steel Company and smelted in its Lucy furnace at Pittsburgh. When the European war broke out and the scarcity of ferromanganese developed, the Pittsburgh Manganese Ore Company shipped a good deal of ore to various open-hearth plants. The ore runs from 46 to 50 per cent. manganese. Part of the output has also been sold to paint manufacturers, who use it to make black paint, and also to brick makers, who use it for producing the black spots in yellow brick. The ore is transported from the mines to a switch on the Norfolk & Western Railroad, where it is washed, and the company is considering the advisability of buying a grinding machine and grinding the ore before shipping it. If this is done, a larger part of the output will be sent to paint and brick manufacturers, as they prefer the pulverized ore for their purposes. W. H. Schoen is president; E. N. Ohl, vice-president; J. V. Speer, treasurer, and A. M. Speer, Jr., secretary.

In *The Iron Age* of September 24, page 720, under the title "World's Drilling Record Claimed," data were given concerning a test of Detroit Twist Drill Company drills at the Foundry & Machine Exhibit at Chicago, September 11. Circumstances connected with these tests which have been brought to our attention since this publication show that the claim of a world's record for this performance should not have been made. In this connection it is but fair to make public the Colburn Machine Tool Company's denial of the statement in the article that this company's drill press was stalled in one of the tests.

DECREASE IN FOUNDRIES

Statistics for the United States and Canada Show a Total of 6507

Statistics compiled by the Foundry show that on August 1 a total of 6507 foundries were engaged in the United States and Canada in the production of gray iron, steel, malleable, brass and aluminum castings, as compared with 6538 on July 1, 1912; 6594 on April 1, 1910, and 6366 in 1908. In the past two years a decrease of but 31 shops is shown, despite unsatisfactory trade conditions and the tendency to establish larger manufacturing units. An interesting disclosure of the compilation is that fully 25 per cent. of the companies that were listed in 1912 do not appear among the plants operating in 1914, at least under the same firm names. Many of the failures among foundrymen are attributed to the lack of proper accounting systems. Over 500 new plants were built in the last two years and many old ones increased their capacities. In compiling the figures each plant was considered as a unit regardless of the number of casting departments it contained. Considering each department as a unit there were 9421 casting plants in the United States and Canada on August 1, 1914, as compared with 9158 in 1912, a gain of 263. In 1910 the total of casting units totaled 9158.

The following table shows the totals of the various kinds of foundries in the United States and Canada:

	1914	1912	
Total foundries, United States	5942	5996	Dec. 54
Total foundries, Canada	565	542	Inc. 23
Gray iron, United States	4574	4475	Inc. 99
Gray iron, Canada	483	468	Inc. 15
Malleable, United States	196	175	Inc. 21
Malleable, Canada	18	15	Inc. 3
Steel, United States	299	299	
Steel, Canada	19	19	

An analysis by States shows that Ohio continues to lead as a malleable castings producer, with 29 shops as compared with 27 two years ago. Illinois is second with 26 and then follow Pennsylvania with 24 and New York with 22. Illinois has supplanted Pennsylvania as the second State. Wisconsin made no gain on the 20 operated in 1912, but Michigan shows an increase from 8 to 11.

In steel foundries Pennsylvania leads with 78, after which comes Ohio with 29 against 34 two years ago, Illinois with 20 against 24 in 1912 and Wisconsin with 20, a loss of two. The new plants have been offset by the dismantling of old ones.

The four leading foundry centers of the United States are Chicago with 170 plants, Philadelphia with 121, New York City with 116 and Cleveland with 104. The brass casting trade shows a healthy growth, as seen from the following table:

	1914	1912	
Total brass foundries, United States	3498	3389	Inc. 109
Total brass foundries, Canada	334	291	Inc. 43
Exclusively brass, United States	1202	1197	Inc. 5
Exclusively brass, Canada	64	61	Inc. 3
Brass departments, United States	2296	2178	Inc. 118
Brass departments, Canada	270	230	Inc. 40
Aluminum foundries, United States	1850	1881	Inc. 31
Aluminum foundries, Canada	176	138	Inc. 38

The E. Keeler Company, manufacturer of boilers, Williamsport, Pa., will celebrate its fiftieth anniversary October 10. A banquet for its employees and sales force will be held at 6 p. m., to be followed by an entertainment at the Lycoming Opera House. A souvenir of the occasion will be given to each guest. The company was founded in 1864 and its career has been consistently prosperous and successful. The uniformly high standard and reliability of the company's output have been determining factors in securing for it a trade and reputation which are nation wide.

The Triumph Electric Company, manufacturer of electric light and power machinery, Oakley, Cincinnati, Ohio, has opened a new office in New York City, located at 114 Liberty street, in charge of W. B. Elliott.

Pittsburgh and Nearby Districts

The Lewis Foundry & Machine Company, Pittsburgh, has received a contract for an electrically operated bar shear, including approach and delivery tables, from the Seneca Iron & Steel Company, Buffalo, N. Y. The shear is designed to cut three bars at one time. The company is also remodeling an auxiliary shear for the Seneca Company and will furnish a cold mill drive, electrically driven, through Falk herringbone gears manufactured by the Falk Company, Milwaukee. The Seneca Company also has been buying sheet mill and auxiliary equipment for extensions to its plant.

The Verona Steel Castings Company, Verona, Pa., near Pittsburgh, is making additions to its plant that will about double its capacity.

The Columbia Steel & Shafting Company has completed a three-story administration building, 50 x 65 ft., at its works at East Carnegie, near Pittsburgh, to which the executive offices have been removed from the Empire Building, Pittsburgh. A chemical laboratory is located on the third floor of the building, and dining room and kitchen are also provided.

Although the general sales offices of the Cambria Steel Company are being removed from Johnstown, Pa., to the Morris Building, Philadelphia, the offices of the purchasing agent, ore agent and traffic manager of the company will remain on the eighteenth floor of the Oliver Building, Pittsburgh.

The Heslop Vulcanizing Products Company, Johnstown, Pa., has purchased ground west of the suburb of Coopersdale, and is making plans for building a new plant.

The stockholders of the Progressive Mfg. Company, Wheeling, W. Va., have decided to change its name to the Wheeling Wrapping Machine Company, and will make Wheeling the permanent headquarters. The company expects to have its wrapping machine ready for the market in a short time. Directors have been elected as follows: M. E. Jackson, Andrew J. Habig, Harry Linton, J. H. Felmlee and S. J. Summers. Mr. Felmlee is the inventor of the machine which will wrap packages and pack them in boxes, ready for shipment.

W. N. Kratzer & Co., Pittsburgh, have recently taken contracts as follows: Furnishing and erecting two structural steel frame buildings for the Lehigh Portland Cement Company, 210 tons; furnishing and erecting structural steel frame building for the General Fireproofing Company, Youngstown, Ohio, 100 tons; furnishing structural steel frame shields for three bridges for the Pennsylvania Railroad Company; structural steel work for the I. O. O. F. Temple, Oil City, Pa., 375 tons; structural steel office and factory building for the Gem Mfg. Company, North Side, Pittsburgh, 110 tons.

The report that the Driggs-Seabury Ordnance Corporation, Sharon, Pa., has received an order for 2500 automobile frames from the French government is officially denied. The corporation is negotiating with some New York importers for automobile frames and trucks for foreign shipment, but as yet has not closed any business.

The mechanical section of the Engineers' Society of Western Pennsylvania met in its headquarters in the Oliver Building, Pittsburgh, on Tuesday evening, October 6. John D. Berg, chief engineer of the Dravo-Doyle Company of Pittsburgh, read a paper on "Steam Turbine Mill Drive."

The Pittsburgh Coal Company has made a reduction of 10 per cent. in all salaries of $100 per month and over, effective from October 1. It is said the reduction will be restored after conditions in the coal trade improve. The demand for coal is quiet and low prices are ruling.

It has been officially announced that the new departments of the Follansbee Brothers Company's works, at Follansbee, W. Va., including the three new sheet mills, galvanizing departments and corrugating plant, will begin operations by the first of the coming year. The mills are now being installed. Two of the mills are the same size as now used, while one is a 35-in. mill. Ten mills are now operating, six of which are tin mills and four sheet mills. The three new mills will be used for the purpose of supplying material for the new galvanizing department.

The Westinghouse Machine Company, East Pittsburgh, Pa., has made a reduction of 8 per cent. in salaries of all employees receiving $100 per month and over. The report that a similar reduction had been made by the Westinghouse Electric & Mfg. Company and the Westinghouse Air Brake Company is incorrect.

An item recently printed in a Philadelphia paper stated that the Pressed Steel Products Company, Sharon, Pa., had received an order from Russia for 100,000 steel barrels. The company states that the report is untrue; that it has not sold any steel barrels to Russia or to any other foreign country.

The safety department of the Youngstown Sheet & Tube Company, Youngstown, Ohio, has issued neatly engraved gold-plated badges to the members of the various safety committees within the works. When the men complete their terms of office, they will turn in the badges and receive engraved gold watch fobs instead. The plan was inaugurated by J. M. Woltz, safety director.

The Alloy Steel Forging Company, Manufacturers' Building, Pittsburgh, whose plant is located at Braeburn, Pa., adjacent to the works of the Braeburn Steel Company, is looking for a site in the Pittsburgh district. If a suitable location is found, the plant will be removed from Braeburn. The company makes a specialty of rolled and forged manganese steel.

The business formerly carried on by the William Harris & Son Company in the manufacture of mine-car hitchings and miners' tools has been taken over by the Pittsburgh Knife & Forge Company. The plant is located on the North Side, Pittsburgh. New equipment has been added and, in addition to manufacturing the Harris line, crucible steel shear knives, solid or iron back, and of any length, are being turned out. W. H. Schoen is president; H. A. Ross, vice-president; A. R. Bassett, secretary and treasurer, and P. A. McBride, general manager.

The United Engineering & Foundry Company, Pittsburgh, has installed a 300-ton hydraulic forging press in the shops of the Bessemer & Lake Erie Railroad at Greenville, Pa.

A miniature model of the playground of the Carnegie Steel Company at New Castle, Pa., which is regarded as one of the finest in the country, is being prepared for the San Francisco Exposition. Before the model is taken to San Francisco it will probably be exhibited in other places. A feature of the institution is the production of practically all the numerous recreation devices in the New Castle works of the company. They are original in design and are said to be extremely efficient.

The General Fireproofing Company, Youngstown, Ohio, has begun the erection of a two-story addition to its plant, 50 x 100 ft.

Pittsburgh Foundrymen's Association

The monthly meeting of the Pittsburgh Foundrymen's Association was held in the Fort Pitt Hotel, in that city, on Monday evening, October 5, preceded by a dinner. The speaker was Professor W. Trinks, of the Carnegie Institute of Technology, and consulting engineer of the Mesta Machine Company. Professor Trinks returned from Europe recently and gave his impressions of conditions over there as he saw them, and also spoke of the prospects of this country developing trade in Europe. His talk was along the lines of the statement he made to *The Iron Age* on his return. A resolution of sympathy was passed on the death of Joseph Fawell, president of Mackintosh, Hemphill & Co. Four new members were added, as follows: Sharon Foundry Company, Sharon, Pa.; McConway-Torley Company and Poland Coal Company, Pittsburgh; Darlington Steel Casting Company, Darlington, Pa.

PERSONAL

R. B. Shover, formerly general superintendent of the open-hearth plant of the Brier Hill Steel Company, Youngstown, Ohio, but who resigned several months ago, has been appointed general manager of the Tata Iron & Steel Company, Sakchi, India, whose plant consists of two blast furnaces, an open-hearth steel works, a rail mill and two merchant bar mills. He expects to start next week for India to take up his new work. He originally went to Youngstown as an electrician for the Consolidated Gas & Electric Company. He next took a responsible position with the Ohio Steel Company, which was afterward absorbed by the National Steel Company, and later by the Carnegie Steel Company, when the United States Steel Corporation was formed. In 1906, he went to Gary, Ind., to supervise the electrical construction at that plant, and returned to Youngstown in 1909, with the intention of taking charge of the construction work of the proposed McDonald mills for the Carnegie Steel Company. However, these mills were not started and in 1912 Mr. Shover was appointed general superintendent of the open-hearth steel plant of the Brier Hill Steel Company.

C. A. Buck, vice-president Bethlehem Steel Company, has returned from an extended stay in Chile, where extensive work is in progress in the development of the Tofo iron mines of the company and in providing ore handling and shipping facilities.

Charles E. Carpenter, sales manager of the Allied Machinery Company of America, 55 Wall street, New York, returned from Europe October 5.

John F. Cantwell, Jr., superintendent of the 8-in. mill at the Lower Union works of the Carnegie Steel Company at Youngstown, Ohio, has resigned to accept a position in the open-hearth steel plant of the Brier Hill Steel Company in the same city.

M. R. Carpenter, an experienced refrigerating engineer, has opened offices in the Pickering Building, Cincinnati, Ohio. He was formerly in charge of a department of the Triumph Ice Machine Company, Oakley, Ohio.

E. J. Roberts, manager of the Roberts Machine Company, East Palestine, Ohio, has sold his interest in that company to J. D. Roberts and Charles F. Myers, of Oakmont, Pa.

D. W. Oskin, formerly in the sales department of the Trumbull Steel Company, Warren, Ohio, has been appointed general manager of sales to succeed George P. Thomas, resigned. E. Theodore Sproull, formerly assistant to the general manager of sales in the plate department of the Jones & Laughlin Steel Company, Pittsburgh, has been appointed assistant general manager of sales of the Trumbull Company.

Carl H. Clement, until recently chief engineer and sales manager of the Metal Products Company, Detroit, Mich., has resigned to become sales engineer for the Bock Bearing Company, Toledo, Ohio.

James F. Conran, formerly manager of the New York City branch of the Standard Sanitary Mfg. Company, Pittsburgh, has been appointed general sales manager of the company.

Ferdinand Schlesinger, Milwaukee, Wis., sailed for Europe October 1. His daughter is the wife of Lieut. Oskar Roller of the Austrian army.

Albert Reuter, who has been connected with the Moller & Schumann Company, Brooklyn, for some years, will hereafter devote special attention to the company's trade on Long Island in connection with any matters relating to varnishes, enamels, and their uses.

Announcement was made in the past week of the retirement of E. H. Gary, chairman of the United States Steel Corporation, from the directorate of all companies not affiliated with the Steel Corporation, including several banking companies in New York and Chicago, the Southern Railway, the Erie Railroad Allis-Chalmers Company, International Harvester Company and American Steel Foundries. It is stated that this action is taken because of the apparently growing public sentiment against interlocking directorates.

Henry Lindenberger, president U. S. Reduction Company, Chicago, has returned from a business trip to Europe.

E. C. Sickles has been engaged as works engineer for the Hyatt Roller Bearing Company, Newark, N. J.

W. M. Mann has been appointed district manager in Texas for S. F. Bowser & Co., Fort Wayne, Ind. His offices will be located in the Commerce Building at Dallas, Tex.

Harry A. Pike, formerly Eastern sales manager for the Flannery Bolt Company, Pittsburgh, and who was also connected with the American Vanadium Company and American Radium Company, is now with the Clifton Porcelain Tile Company, Newark, N. J., which is developing a new industry—the manufacture of a porcelain faced wall and floor tile by a non-lead process. He will be the general sales manager of the company when the manufacturing plant is completed and ready for business. Meanwhile, he is looking after important details in the development of the company.

George Beaumont, of the iron-ore and blast-furnace departments of Pickands, Mather & Co., Cleveland, Ohio, has gone to Pasadena, Cal., to spend the winter.

L. A. Green has withdrawn from the L. A. Green Equipment Company, and is now located at 1409 First National Bank Building, Pittsburgh.

Lake Ore Shipments in September

The shipments of iron ore down the lakes from the Lake Superior region in September totaled 5,431,307 gross tons, as compared with 7,259,662 tons in September, 1913, a decrease of 1,828,355 tons. The following table gives the September and season shipments by ports and the corresponding figures for 1913, all in gross tons:

	September, 1914	September, 1913	To Oct. 1, 1914	to Oct. 1, 1913
Escanaba	553,959	673,591	3,019,651	4,297,223
Marquette	335,928	418,242	1,385,718	2,573,604
Ashland	662,141	485,174	2,741,917	3,558,802
Superior	1,901,422	2,226,802	9,478,253	10,818,324
Duluth	1,126,532	1,938,823	5,278,899	9,830,726
Two Harbors	851,325	1,518,030	4,804,975	8,194,738
Total	5,431,307	7,259,662	26,709,413	39,273,417

The Duluth percentage to October 1 was 19.76 this year as compared with 25.03 last year while the Great Northern dock at Superior shipped 33.21 per cent. of the total against 26 per cent. to October 1, 1913.

The J. A. Nickerson Company, Lincoln Inn Court Building, Cincinnati, Ohio, reports numerous contracts for metal lockers made in the past 30 days, indicating that business conditions in the Central West are improving. One of its latest contracts covers 1200 lockers for the Delco Company, Dayton, Ohio, the total shipment weighing more than 25 tons. The company has just finished a contract for installing lockers in the new eight-story building of the Cincinnati Bell Telephone Company, as well as others for several large schools in the vicinity of Cincinnati. The Nickerson Company represents the Hart & Hutchinson Company, New Britain, Conn.

The largest power transmission by means of chains, according to F. L. Morse, president Morse Chain Company, Ithaca, N. Y., is one consisting of two drives, each of 2500 hp. capacity, for operating a 5000-hp. generator in an Idaho power plant. There are eight chains all told, 21 in. wide and of 2-in. pitch. The sprockets have 71 and 47 teeth and are of 45.59 in. and 30.31 in. in diameter respectively, and each of a face of 92 in. The sprockets are 129 in. center to center, and each carries, as stated, four chains, each 21 in. wide.

NEW SOUTHERN IRON RATES

Cause of the Confusion Arising from the Recent Reduction

ALL ROADS HAVE NOT REDUCED RATES

WASHINGTON, D. C., October 7, 1914.—The Interstate Commerce Commission has received the past week a large number of complaints from sellers and consumers of pig iron doing business at points north of the Ohio River. They allege that the tariffs filed by the railroads which were defendants in the case of the Sloss-Sheffield Steel & Iron Company, et al., vs. the Louisville & Nashville Railway Company, et al., have not afforded the relief anticipated and that the complainants are being obliged to pay the old rates on Southern pig iron while points in contiguous territory have been favored since October 1 with the reduction of 35c. per ton as ordered by the commission.

Some of these complaints are based on the contention that the roads against which the complaints were directed in the Sloss-Sheffield case have failed to comply with the commission's order; other complaints have been filed by parties located on railroads which were not defendants in the Sloss-Sheffield case, but which complainants appear to think are bound by the commission's ruling; while a third class, more experienced in litigation before the commission, state frankly that through an oversight all the railroads serving the territory in question were not specifically named in the original complaint, and, therefore, are probably not under any legal obligation to meet the new rates. The commission's advice is solicited as to what action should be taken to secure an extension of the order made in the decided case to the roads not specified in the original complaint. In addition to the letters from sellers and consumers of pig iron, communications have been received from certain railroad companies, parties to the original case, calling attention to the inequitable conditions now existing and suggesting that the commission should take the initiative in securing the general application of the order made in the Sloss-Sheffield case.

AN ENTIRELY NEW CASE NECESSARY

All the interested parties are advised that it is not possible for the Interstate Commerce Commission, under the law and adopted rules of practice, to afford the desired relief except upon the presentation and hearing in due form of an entirely new complaint directed specifically against the railroads omitted from the Sloss-Sheffield case. The commission, in replying to complainants, rarely makes a specific suggestion looking to litigation, and, adhering to this policy, its replies to the complaints received in this case have been limited to a statement of facts, namely, that the October 1 tariffs filed by the roads made defendants in the Sloss-Sheffield case have appeared to conform fully to the commission's order and that the commission has no power to extend that order to roads which were not named in the original complaint, and which, therefore, have not been granted a hearing. Unofficially, however, the commission officials point to the only remedy now available which is in filing a new case directed against all the railroads serving points in interest which were not specified in the original complaint. In this connection the commission calls attention to the list of defendant roads in the Sloss-Sheffield case, as follows:

Louisville & Nashville Railroad Company; Illinois Central Railroad Company; Alabama Great Southern Railroad Company; Cincinnati, New Orleans & Texas Pacific Railway Company; St. Louis & San Francisco Railroad Company; Southern Railway Company; Seaboard Air Line Railway; Atlanta, Birmingham & Atlantic Railroad Company, and H. M. Atkinson and S. L. Schoonmaker, receivers thereof; Mobile & Ohio Railroad Company; Nashville, Chattanooga & St. Louis Railway; Tennessee Central Railroad Company; Tennessee, Alabama & Georgia Railroad Company; Virginia & Southwestern Railway Company; Western & Atlantic Railroad; Ocean Steamship Company, Savannah; Merchants & Miners' Transportation Company; Clyde Steamship Company; Old Dominion Steamship Company; Norfolk & Western Railway Company; Baltimore & Ohio Railroad Company; Philadelphia, Baltimore & Washington Railroad Company; Pennsylvania Railroad Company; Western Maryland Railway Company; New York, New Haven & Hartford Railroad Company; New York Central & Hudson River Railroad Company; Boston & Maine Railroad; Pittsburgh, Cincinnati, Chicago & St. Louis Railway Company; Chicago & Eastern Illinois Railroad Company; Chicago, Indianapolis & Louisville Railway Company; and Carolina, Clinchfield & Ohio Railway.

The commission is advised that a number of railroad systems, not embraced in the above list, including the Cincinnati, Hamilton & Dayton, the Cleveland, Cincinnati, Chicago & St. Louis and the Baltimore & Ohio Southwestern, serve territory in which consumers of importance are located and prospective complainants are urged to co-operate in the careful investigation of the railroad situation so as to insure the inclusion in the new complaint of all carriers who should be made defendants.

WILL TAKE PERHAPS SIX MONTHS

The new case, which it is assumed will be promptly filed by the interested parties, can hardly be settled within less than six months. The original case occupied the commission for more than a year, but as the chief issues were then threshed out it is assumed that the delay in the decision of the new case will be only such as is necessary to meet the requirements of the commission's rules of practice. As soon as the complaint is filed it will be served upon the defendant roads, which are allowed 20 days to reply. Assuming that the roads do not voluntarily make the desired change, the issue will be joined before the commission and about 15 days' notice given of the date set for hearing the case. After the evidence is in the complainants will be given 30 days in which to file their brief, 15 days will be allowed for the filing of the defendants' brief, and 10 days for the complainants' reply brief. If argument is necessary, 10 to 15 days may then be required. After the case is submitted the commission usually takes about 90 days before its decision is handed down. It is possible, however, that some time may be saved by stipulations agreed upon by both parties.

It is, of course, a somewhat remote possibility that the railroads not made defendants in the original case may agree to amend their tariffs in accordance with the commission's former order, but such a proceeding is not to be expected and cannot be counted upon, and officials of the commission do not believe that the controversy will be settled except as the result of a regular proceeding. W. L. C.

Carnegie Steel Company May Reduce Wages

On Wednesday, September 30, the Carnegie Steel Company of Pittsburgh posted the following notice at all its plants operated under wage agreements:

Referring to the agreement concerning wages made January 1, 1899, the undersigned, in accordance with the provisions of the agreement, hereby gives notice that it desires to terminate the agreement as of December 31, 1914. At the end of the year or thereafter either party will be at liberty to ask for such readjustments or changes in the scale as may be equitable.

CARNEGIE STEEL COMPANY,
A. C. DINKEY, President.

Pittsburgh, Pa., September 30, 1914.

As noted above, the agreement continues in force unless 90 days' notice is given by either side of a desire to terminate it. While the Carnegie Steel Company has not definitely decided to reduce wages, it is putting itself in position to do so on January 1, 1915, if such action appears necessary. Unless there should be considerable improvement in the steel business between now and January 1, it is quite certain the company will readjust to a lower basis the wages of tonnage men and probably of day labor as well. For some time the Carnegie Steel Company has been paying about $2 per day for common labor, and it is claimed that at some manufacturing plants in the Pittsburgh and Valley districts such labor is paid as low as $1.60 per day. The posting of this notice shows clearly the very serious depression existing in the steel trade and emphasizes the fact that the immediate outlook is not encouraging.

The Machinery Markets

A slow but steady improvement continues in several manufacturing and selling districts and the probabilities are that it will grow with a more complete realization of the effects certain to follow the placing in this country by foreign governments of orders for goods to the value of many millions of dollars. These goods, of course, include many varieties, but it must not be overlooked that machinery enters into the manufacture of all of them. Purchases of machine tools by companies which must increase their production facilities to fill foreign orders in the specified time are noted in New York. In Detroit September showed a better volume of sales than did previous months, inquiries for one or two tools continue plentiful and the trade is optimistic. In Cleveland domestic business continues light, but orders emanating from foreign arsenals are encouraging. Confidence is general in Cincinnati, partly because of some excellent export orders. Chicago lacks both domestic and foreign business. In Milwaukee the slight improvement continues. Demand in the central South is a little stronger. In Birmingham machinery dealers are marking time. The improved tone in St. Louis continues. Texas conditions look better despite disappointing developments in Mexico. The machinery trade in San Francisco and in the Pacific Northwest is quiet. New England reports that exports are on the increase and that the machinery business is improving. In some cases exports, which were held up by the outbreak of the war, are now going forward.

New York

NEW YORK, October 7, 1914.

While the trade generally continues quiet there continue to come to light good sales which are traceable to demands upon American manufacturers for materials which are needed by the armies now in the field in Europe. At first, stress was laid upon the demand that would develop here for munitions of war, but now it is seen that the call is for a large part of the enormous variety of articles which armies need, even in times of peace. A commission representing foreign governments is placing the orders. In all cases orders placed here in behalf of the foreign governments specify quick delivery and where present manufacturing facilities are inadequate they must be increased if the order is to be filled. A western New York company which has undertaken an order to supply 300 motor trucks has placed an order for machine tools and the same has been done by small-arms and ammunition manufacturers. The Bethlehem Steel Company, whose recent purchase of automatics was referred to last week, is in the market for several more of these and other types of machines. The company has purchased many turret lathes, both large and small. That the regular export movement is opening up again is indicated by the shipment to England of machines that were to be sent to Russia a few weeks ago, but which were held up when the war broke out and foreign shipments were temporarily paralyzed. An unpleasant feature of trade in general is the difficulty experienced in making collections, for which the tight money market is responsible. In many cases delay in payment is sought, even where machines have been installed on lease and part payments only are expected.

Most of the United States Government shipyards are busy though they are not buying new machinery at this time. At the Brooklyn Navy Yard work in hand includes repairs, a new battleship and the construction of two Diesel engines of 2500-hp. each. The Newport News Shipbuilding & Dry Dock Company and the New York Shipbuilding Company were the two lowest bidders for the construction of the two 32,000-ton battleships to be built for the United States Navy this year. The first company bid $7,115,000 for one ship and the latter company $7,175,000 for the other, and each will receive a contract.

H. D. Best & Co., 320 Fifth avenue, New York City, have received the general contract for the construction of a can factory at the Devoe works of the Standard Oil Company, at Long Island City. The new structure will be of reinforced concrete, two stories, and will cover a plot 145 x 380 ft. It will cost about $200,000. The plans were prepared privately by the owner's engineers.

Michael J. Dady, East River and One Hundred and Thirty-seventh street, New York, has leased the shipyard and shop of the Southern Ship Building Company, Tottenville, S. I., consisting of docks, stores, shops, compressed air plant, etc. It will be used for general shipbuilding repair work.

Samuel Garber, 332 Melrose street, Brooklyn, N. Y., is having plans prepared for a three-story brick factory, 50 x 100 ft., to cost about $15,000.

Schenectady, N. Y., has rejected all bids for flood pumps and a sewerage disposal plant and will readvertise for bids.

A waterworks system will be built for Sheridan, N. Y., at a cost of $12,500.

The Titanium Alloys Mfg. Company, Niagara Falls, N. Y., is taking bids for a 40 x 87 ft. addition to its plant.

The Campbell Soup Company, Camden, N. J., has had plans prepared for a brick and reinforced concrete factory to be erected at Gloucester, N. J.

Ferdinand D. Fleming, Franklin Bank Building, Philadelphia, has taken bids for the construction of a two-story factory, 40 x 100 ft., of brick and concrete, to be erected at Front and Florist streets.

The F. J. Stokes Machine Company, Seventeenth and Cambria streets, Philadelphia, manufacturer of pharmaceutical and chemical machinery, is about to start the erection of a two-story extension to its machine shop, 45 x 48 ft. No addition to the machinery equipment is planned for the present.

The Tinius Olsen Testing Machine Company, 500 North Twelfth street, Philadelphia, proposes to install air hoists, etc., in its new addition to the erecting room.

Edwin S. Summons, Jr., 209 North Sixth street, Reading, Pa., is equipping a factory for the manufacture of optical goods.

A permit has been issued for a waterworks system for the Eastern Pennsylvania Institution for Feeble Minded, Spring City, Pa., to be developed from drilled wells.

Norristown, Pa., will sell $100,000 of sewage disposal plant bonds November 3. The borough clerk should be addressed.

The Bridgewater Flow Corporation, Bridgewater, Va., has increased its capitalization from $10,000 to $25,000 and is completing the equipment of an additional building. Shears, punches, etc., are being installed.

The Southern Metal Company, Richmond, Va., has been organized with $15,000 capital stock by George Smith and H. W. King.

Additional pumping equipment is to be installed in the waterworks of Lynchburg, Va., according to plans of H. L. Shaner, city engineer.

New England

BOSTON, MASS., October 6, 1914.

The most encouraging feature of the situation in the machinery trade is the fact that exportations to Europe are on the increase. Not only are orders for equipment which have to do with the manufacture of war materials being received in increased numbers, but shipments which were held up at the outbreak of hostilities are now going forward in considerable volume. This applies to machine tools and to textile and other miscellaneous machinery.

No doubt exists that the machinery business is improving. Domestic orders aggregating not a small total are supplementing those which can be traced to foreign sources. In fact, a new period has opened in respect to this branch of business. American manufacturers who have relied upon European markets for some parts of their product are now compelled to depend upon other sources of supply, which means, in many cases, that either they or those from whom they will purchase hereafter must put in new machinery. Already some very nice orders have been placed because of this condition. One very large house manufacturing machine tools which has been exceedingly dull is now running 55 hours a week in several departments. Scattered through New England is quite a good deal of this class of new business.

The American & British Mfg. Company, Bridgeport, Conn.,

is planning the erection of a building to be used in connection with the manufacture of ordnance. A part of the building will be equipped as a machine shop.

The Farrel Foundry & Machine Company, Ansonia, Conn., has awarded the contract for a factory, most of the space of which will be used for storage and as an erecting shop.

The Connecticut Reformatory, Cheshire, Conn., which will erect a building to be used for manufacturing purposes, states that no definite decision has been reached as to the nature of the products to be manufactured and therefore no idea of the requirements for equipment can be given.

The Eagle Iron Foundry, Inc., Salem, Mass., states that the work of rebuilding its plant on Canal street will begin immediately, and the expectation is that the plant will be ready for business before the end of the year. The equipment has been contracted for.

C. J. Bates & Son, Chester, Conn., manufacturers of ivory and steel specialties, state that they will need very little new equipment for the building which is in process of construction. As soon as it is completed, probably by November 1, the firm's factory in Newark, N. J., will be moved to Chester.

The plans and specifications for an auxiliary pumping station for the city of Fall River, Mass., will be altered.

The City Directors, Salem, Mass., have awarded $40,000 of water loan bonds.

Chicago

CHICAGO, ILL., October 5, 1914.

With the exception of one inquiry for a number of tools from a local industrial interest, the market is practically lacking in prospective business in machine tools. The West has not been compensated as yet by the development of any foreign business of consequence to offset the serious slump at home. The railroads are buying nothing. The tools purchased a number of weeks ago by the Chicago & Western Indiana Railroad for its new shop are still in the hands of the makers for lack of shipping instructions, but an early release of this business is anticipated. Among the miscellaneous inquiries noted during the week is one for a 25 and 50-hp., 220-volt, alternating-current motor; a 9-in. engine lathe; a 60 to 70-hp. automatic steam engine; a 35-hp., 220-volt, alternating-current motor, running at 1200 r.p.m., and a 16-in. second-hand shaper.

The Crane Company, Chicago, is continuing the completion of its new plant without interruption, and the past week has taken out permits for three additional factory buildings and a garage, representing a total cost of $270,000.

The Henry Roos Foundry Company, 1749 Ballou street, Chicago, which has been conducting a foundry business for a number of years, is building a new two-story foundry, 102 x 130 ft., to cost $25,000.

The Fischer Furniture Company, 412 North May street, Chicago, is about to erect a three-story factory, 24 x 100 ft., to cost $7500.

Hatzfeld & Knox, architects, 7 South Dearborn street, Chicago, have completed plans for a garage, 50 x 125 ft., to be erected at a cost of $12,000.

The Ostrander-Seymour Company, 5421 Stewart avenue, Chicago, has had plans prepared for a one and two-story factory, to be erected on Shields avenue, at Garfield boulevard.

F. D. Chase, architect, Peoples Gas Building, Chicago, is receiving tenders on the erection of a one-story foundry, 80 x 150 ft., to be erected at Hoopeston, Ill.

The Central Locomotive & Car Works, Chicago Heights, Ill., which recently resumed operations on the strength of a large order for car repairs, has received an additional order for 500 freight cars from the Erie Railroad.

The Johnson-Meier Company, Chicago, has been organized with a capital of $30,000 to engage in the manufacture of specialized metal products. The incorporators are Edward Johnson, Charles A. Meier and William P. Thornton.

The Peoria Hydraulic Pump Company, Peoria, Ill., has been incorporated with a capital stock of $20,000 by O. N. Robertson, E. F. Crehore and C. W. Hayl, and will equip to manufacture pumps.

The Bonner Tool Company, Champaign, Ill., capitalized at $700,000, has filed a petition in involuntary bankruptcy, and G. W. Cushman has been appointed receiver.

Construction is to begin at once upon a blacksmith shop for the State Hospital at Kankakee. Plans are in the hands of Frank D. Whipp, superintendent, Springfield, Ill.

The City Council, Fairfield, Ill., is planning to add a generator to the municipal electric plant.

The Craycraft Leich Electrical Company, Genoa, Ill., has completed arrangements to move to Elgin, and has installed equipment in a factory now under construction.

S. Pardee, Little York, Ill., is completing an addition to his garage, which will provide machine shop facilities and for which a number of tools are to be purchased.

George Green and Earl Sperry, Aurora, Ill., are seeking a location in that city for a garage and machine shop, with which a small manufacturing business will be conducted.

The Tangley Mfg. Company, Muscatine, Iowa, manufacturer of musical instruments, is erecting a factory, for which both metal and wood-working equipment is to be purchased. Small and bench lathes with auxiliary factory equipment will be needed.

The Shorthill Steel & Iron Works, Des Moines, Iowa, has been declared insolvent and B. Frank Prunty has been appointed receiver.

The Barry Mfg. Company, Muscatine, Iowa, manufacturer of pearl button machinery, has let the contract for a three-story factory, 140 x 400 ft., to cost about $100,000. It will be used for the manufacture of a patented steel pulley.

The Perfection Spring Wheel Company, 533 West Ray street, Indianapolis, Ind., recently incorporated to manufacture a patented wheel, has equipped a factory and plans to install about $3000 of additional machinery. Harry Weill is president and Max Cabel, vice-president.

Ankeny, Iowa, will receive bids until 8 a.m., October 12, for a waterworks system to cost $12,000. J. C. Marts is mayor.

T. H. Berg, city clerk, Lincoln, Neb., will receive bids until 2 p. m., October 15, for water and lighting plant machinery to cost about $15,000.

Talmage, Neb., will sell $9500 worth of electric light system bonds October 5.

The Western Light & Power Company, Boulder, Colo., will install a new lighting system.

Milwaukee

MILWAUKEE, WIS., October 5, 1914.

The situation continues to show slight improvement. While conditions are far from being satisfactory, there is every reason to believe that matters are gradually working back. The opinion that the European war must improve domestic business is already being borne out, although only in a small way. Trade extension promotion undertaken by manufacturers in all lines has resulted in a decided increase in inquiries which should develop into some business. Purchases continue to be for urgent and necessary replacements rather than the increase of facilities; and the fair amount of new tool business that is being transacted shows all the earmarks of this condition. An encouraging local factor is the decided increase in building operations in September. Permits were issued in Milwaukee for 379 structures valued at $1,162,004, as compared with 333 permits and a value of $874,509 in September a year ago. For the previous four or five months permits showed a steady falling off and the September gain is looked upon as a good sign of the improvement apparent in all lines.

The American Woodworking Machine Company, Rochester, N. Y., has closed its branch plant at Green Bay, Wis., and the equipment will be transferred to the main plant in Rochester. It is concentrating its production on account of trade conditions.

V. L. Hanschel, Menomonie, Wis., has purchased a site and will build a garage and repair shop to cost about $5000.

The Milwaukee Motorcycle Company, 834 Muskego avenue, Milwaukee, which engaged in the manufacture of motorcycles several months ago, has filed a voluntary petition in bankruptcy. Liabilities are $7802 and assets $30,700.

The plant of the United Refrigerator & Ice Machine Company, Kenosha, Wis., will continue to operate. The creditors have agreed upon a plan of finance to cover the situation brought on by the suspension of the Commercial & Savings Bank, of Racine, Wis. The bank will reopen shortly and the condition of a number of important industries affected by its suspension will be relieved without serious effect.

The Ford Motor Company, Detroit, Mich., has leased the new factory at 576-578 Clinton street, erected by the George J. Meyer Mfg. Company, manufacturer of boilers and machinery, Milwaukee, for its Milwaukee assembling plant. It has also leased the Hickman-Lauson-Diener garage at 137-143 Eighth street for the sales and service branch established in Milwaukee, October 1. A. W. L. Gilpin is manager.

The General Appliance Company, Marinette, Wis., has filed a voluntary petition in bankruptcy and schedules assets at $22,997 and liabilities at $36,569.

The Horicon Truck Company, Horicon, Wis., capital $100,000, has been incorporated to manufacture motor trucks

and commercial vehicles. The corporators are Mackey Wells, Milwaukee; B. H. Tallmadge and John A. Dietrich, Horicon. It is not ready to announce its plans.

Plans for the addition to the plant of the John Hoberg Paper Company, Green Bay, Wis., are being prepared by Anderson & Williams, architects, Green Bay. The building will be 40 x 164 ft., three stories, of reinforced concrete with steel roof. Frank H. Hoberg is president.

Robert Kessler and Arthur O. Wagner, Prairie du Sac, Wis., have formed a partnership under the style of Kessler & Wagner, and will build a garage and repair shop to cost about $5000.

The Hall Brothers Automobile Company, Manitowoc, Wis., has started work on a garage and repair shop, 70 x 100 ft., one story, of reinforced concrete.

The Lehigh Valley Coal Company has decided to erect at Manitowoc, Wis., an electrically operated coal dock with a daily capacity of 25,000 to 30,000 tons.

The Bukolt Mfg. Company, Stevens Point, Wis., manufacturer of mechanical appliances, steel tire straps, etc., is planning to erect an addition next spring and has purchased a site 74 x 150 ft., adjoining its present plant. The capital stock will be increased by $50,000.

Hunt & Machia, automobile dealers, Sawyer, Wis., are making plans to replace their garage, destroyed by fire two weeks ago, with a fireproof building, 45 x 80 ft. Work will begin October 10.

The Wausau Foundry & Machine Company, Wausau, Wis., has been organized to manufacture feed mills, grinders and other patented mechanical farm equipment. J. Howarth is president; W. Anderson, vice-president and Albert Kraatz, secretary-treasurer.

Cleveland

CLEVELAND, OHIO, October 5, 1914.

While reports are fairly plentiful regarding orders placed and inquiries pending for machinery needed by American manufacturers who have taken orders for foreign war materials, none of this business appears to have come to the machine-tool builders in this immediate territory. Some foreign orders for machines for arsenal purposes are coming out, but these in the aggregate are not large. Some new export inquiries are pending. Machine-tool builders generally report a light volume of domestic business. Drill presses are in fair demand. Forging machinery is very quiet. While conditions with builders show little change, business with local dealers is slightly more active. Plants making automobile parts and accessories are busier than they were a few weeks ago. Some improvement is noted in the demand for steel castings.

The Cleveland Machine & Forging Company, Cleveland, is enlarging the capacity of its plant by the installation of a number of new hammers and presses and some other equipment, and estimates are now being prepared for an addition to its plant. One of the new large presses will be used for the forging of automobile pistons.

Cleveland, Ohio, will receive bids October 14 for a cantilever for the waterworks department and for superstructures for filters, administration building and gate house for a new filtration plant. The contract for three low-lift steam turbine reduction gear-driven centrifugal pumps for which bids were received recently was not placed, and new bids will be taken October 21.

The National Hinge Company, Cleveland, is being organized with a capital stock of $500,000 to place on the market a new line of hinges for various purposes. An office has been opened at 742 Rockefeller Building, in charge of H. W. P. Storer. The company plans the erection of a plant in this city.

The York Co-operative Tire & Rubber Company, New Orleans, La., of which Leslie Dunn is president, is negotiating with the Chamber of Commerce, Canton, Ohio, to erect a plant in that city for the manufacture of automobile tires and a cotton factory for the manufacture of tire fabric.

The New Mfg. Company, Canton, Ohio, maker of hay tools, will erect a brick factory.

The Kiddey Boiler Works and the Canton Welding Company, Canton, Ohio, have been consolidated under the name of the Canton Welding & Boiler Company, with a capital stock of $10,000. The incorporators are J. S. Kiddey, J. W. Selway, A. J. Weidmaier, and others.

The F. A. Herrick Company, Toledo, Ohio, has been incorporated to take over the business that has been conducted under the same name for a number of years at Jackson, Mich. It will move its plant to Toledo and place on the market a new agricultural tool rack and a new line of tool brackets for use in hardware stores. F. A. Herrick is president. The present headquarters are 1429 Twenty-second street, Toledo.

S. A. Kinnear, director of public works, Columbus, Ohio, will receive bids until noon October 12, for furnishing a motor-driven centrifugal pumping plant.

Kenmore, Ohio, will sell, on November 3, $35,000 of waterworks bonds. The city auditor should be addressed.

The Hardy Paint & Varnish Company, Toledo, Ohio, will erect a factory building and warehouse.

An ordinance has been passed providing for the enlargement and improvement of the waterworks system of the city of Lima, Ohio, and for equipping and furnishing it as well.

Cincinnati

CINCINNATI, OHIO, October 5, 1914.

Not since the outbreak of the European war has there been a more widespread manifestation of confidence in the general situation than at present. During the past few days Cincinnati machine tool makers received orders for a total of 142 lathes. Most of this business came from European customers, although several scattered domestic orders are included. Planers and shapers do not seem to be in very good demand, but it is reported that milling machine manufacturers are receiving a large number of inquiries and are booking a number of orders.

The harness and saddlery manufacturers are preparing to work overtime on foreign orders recently received. One firm booked an order that will total $750,000. The shoe factories are also busy.

Last week two large local machine tool plants were able to put on full forces and on full time. A few others are extending their working time, but are not yet up to normal. The demand for both refrigerating equipment and woodworking machinery continues light.

Work is progressing rapidly on the plant of the Cincinnati Locomotive & Car Works, Covington, Ky., that was recently destroyed by fire. It will probably be ready for its machinery within 30 days.

H. Ley & Co., Cincinnati, structural iron workers, contemplate an addition to their plant on Lincoln avenue.

The Reliance Engineering Company, Fourth National Bank Building, Cincinnati, is preparing plans for an electric lighting and waterworks plant to be erected at Camden, Ohio.

The Manss-Kiley Shoe Company, Cincinnati, has completed an addition to its plant on Gest street, and has added 250 employees to its payroll.

J. B. Richards, Ashland, Ohio, is erecting a public garage, with which will be connected a small repair shop.

The Central Warehouse Company, Columbus, Ohio, has acquired a building on West Randolph street, in which it will install a number of gravity conveyors.

The Forest Brick & Tile Company, Forest, Ohio, is building a plant. Asa Conley is manager.

An ordinance has been passed authorizing the expenditure of $3500 for the improvement of the city waterworks system of Springfield, Ohio. W. H. Mahoney is clerk of the city commission.

Pollard & Elms, engineers, Cincinnati, Ohio, will receive bids until October 15 for repairing a power pump and delivering one water-power-operated pump, for Middletown, Ohio.

Wheeling

WHEELING, W. VA., October 5, 1914.

J. D. Pribble, Glasgow, W. Va., is planning the establishment of a veneer mill. Steam equipment will be used.

The Big Eagle Mining Company, Ottawa, W. Va., is in the market for hoisting equipment. Prices are invited.

The Marion Products Company, Fairmount, W. Va., will install additional equipment for the manufacture of ice cream and soft drinks. F. R. Brahm is manager.

The Logan County Light & Power Company, Logan, W. Va., will build a power plant. Four 500-hp. water-tube boilers, two 2500-kw. turbines, pumps, condensers, etc., will be needed. Francis R. Weller, Hibbs Building, Washington, D. C., is the engineer.

The Wilt Bolt Nut-Lock & Mfg. Company, Oak Hill, W. Va., has been incorporated with $5000 capital stock by S. W. Wilt, S. F. Duncan, H. A. Duncan, and others.

The Chester Rubber Tire & Tube Company, Chester, W. Va., has purchased additional ground and will enlarge its plant.

Detroit

DETROIT, MICH., October 5, 1914.

September showed a better volume of sales in the local machine-tool market than has been experienced for a number of months, although business continued considerably less than normal. The past week, however, has found the market somewhat depressed and there has been a falling off in the number of sales. Inquiries have continued to be fairly plentiful but are mostly for one or two tools or for special equipment of various kinds. Industrial conditions in the metal working and allied trades are unchanged, but there is a spirit of cheerfulness among manufacturers which has been conspicuously lacking during the summer. Makers of automobile accessories generally are busy. New construction work is light and of little interest to the trade.

The John Johnson Company, Detroit, manufacturer of tents, awnings, etc., is erecting a three-story addition to its plant, containing about 6000 sq. ft. of floor space. Some new machinery will be installed.

The Berry Automobile Pump Company, Detroit, has been incorporated with a capital stock of $10,000 by Henry J. Berry, William W. Gunn and Charles Redder. The new company, which will engage in the manufacture of pumps and other devices, has already secured factory quarters.

The Detroit Gear & Machine Company, Detroit, is enlarging its manufacturing facilities by the erection of a one-story addition to its plant.

The Wagner Resilient Wheel & Tire Company, Detroit, has been incorporated with $500,000 capital stock by William F. Wagner, A. C. Baird, T. E. Russell, and others, to manufacture and deal in vehicle wheels, tires and accessories.

The Palmer Bee Company, Detroit, dealer in power transmission and conveying machinery, will erect a warehouse at Cameron avenue and Grand boulevard.

The Ellis Engine Company, Detroit, has acquired a new factory, 90 x 110 ft., two stories, at Grand boulevard and Oakland avenue. It will be equipped with modern machinery.

The Puritan Machine Company, Detroit, machinist, is erecting an addition to its plant. It reports a good volume of business.

The Detroit Creamery Company, Detroit, has taken out a building permit covering the erection of a two-story stable and garage, 245 x 247 ft., to cost $118,000.

The Rob Roy Mfg. Company, Detroit, has been incorporated with a capital stock of $20,000 and will engage in the manufacture of shock absorbers and other automobile accessories.

The Joy-Stoffer Mfg. Company, Muskegon, Mich., has acquired a factory and will engage in the manufacture of sash, doors and refrigerators. Frank A. Joy and Albert Stoffer are the principal stockholders.

F. S. Sherman, Hastings, Mich., is president of a company which has been organized to manufacture electric cleaning machines. It is stated that a factory has been secured.

The Helvetia Milk Condensing Company, Helvetia, Ill., will erect a milk condensery at Wayland, Mich., The plant will be 180 x 260 ft., one and two stories.

The Lyons Machine & Mfg. Company, Muskegon, Mich., has been adjudicated a bankrupt. Kirk E. Wicks, Grand Rapids, Mich., is the referee in charge.

The Jackson Cover & Bag Company, Jackson, Mich., has been incorporated with $12,000 to engage in the manufacture of automobile covers.

The John W. Ladd Company, Saginaw, Mich., has placed the contract covering the erection of its proposed machine shop at a cost of $50,000.

The Central South

LOUISVILLE, KY., October 5, 1914.

A slight improvement in business conditions is developing and machinery men report a somewhat stronger demand. The volume of business is still below normal for the season. Public service plants are being built by municipalities and stock companies in many communities, although this work is being interfered with by the difficulty of marketing bond issues made for that purpose. Plants of this kind are taking a good proportion of the power equipment being sold. Gasoline engines are moving well to moving picture theaters in small towns, the engines being used in connection with dynamos to generate electricity, needed in the operation of the machines. Automobile garages are also taking considerable equipment. About the only special machinery moving well at present is that used in tobacco warehouses.

The Henry Vogt Machine Company, Louisville, reports the demand for boilers and ice machines, its principal products, to be only fair, but enough business is ahead to keep the plant running five and a half days a week, which is above the average for metal-working plants in this territory.

The Benzole Garment Cleaning Company, Louisville, has announced plans for a new plant, which will be built in the spring. Boilers, engine, generator motors and special equipment will be needed. C. P. Harding is president.

The Thoroughbred Film Company, Great Southern Building, Louisville, is planning to establish a plant to manufacture motion picture films.

The Louisville Soap Company, Louisville, which planned to erect a large addition to its factory, has announced that the plans have been dropped for the present.

The Harrodsburg Ice & Produce Company, Harrodsburg, Ky., will build an addition to its plant and will increase the capacity of its ice-making equipment 20 tons. An additional boiler will be needed. W. N. Brown, Jr., is manager.

W. E. Rogers and W. O. Nelson, Guthrie, Ky., are organizing a company to build a water system.

T. W. Minton & Son, Barbourville, Ky., manufacturers of vehicles stock and handles, are in the market for self-feed and hand-feed ripsaws, swing or inverted cut-off saws and other special machinery. Steam power will be used.

The Dark Tobacco Company, Richmond, Va., will erect a building for storing and prizing tobacco at Bowling Green, Ky. Steam power machinery, presses, etc., will be required.

The Elizabethtown Heating Company, Elizabethtown, Ky., has been incorporated with $1500 capital stock by W. C. Montgomery and others.

The plant of the Garden City Tablet Company, Elkhart, Ind., was recently destroyed by fire with a loss of $100,000. The plant of the Elkhart Paper Company, adjoining, was slightly damaged also.

The planing mill and furniture factory operated by John Walker, Rogersville, Tenn., was burned recently with a loss of $10,000. Plans for rebuilding are now being considered.

The Atlas Garage & Machine Company, Memphis, Tenn., which, as recently reported, is equipping a repair shop, is in the market for a 14-in. by 8-ft. American quick change lathe, in addition to a small gear cutter. Address J. C. Scott, the manager.

John and Andrew Dotson, Burns, Tenn., are planning the establishment of a hoop mill, and will need steam power and special machinery.

Birmingham

BIRMINGHAM, ALA., October 5, 1914.

The lumber business of the South is at a standstill, practically no trading is taking place in that quarter, except for machinery for the rebuilding of several burned plants, principally in Florida. Machine tools for mining and foundry purposes are selling fairly well. Machinery dealers are simply marking time and hoping for a change. Several houses have reduced working forces.

The Dixie Pipe Company, Gadsden, Ala., has been incorporated with a capital stock of $40,000 and will build a soil pipe factory. Robert Campbell is president. J. S. Carroll, F. B. Ray and J. M. Robinson are also among the stockholders.

The Opelika Oil Mill Company, Opelika, Ala., has been incorporated with a capital stock of $10,000 to operate an oil mill and fertilizer factory. W. F. Hendmon, R. B. Douglass and W. D. Hendmon are among the owners.

John L. Ray, Gaylesville, Ala., is inviting bids for installation of a hydroelectric plant for a town of 50 inhabitants.

The City Delivery Company, Mobile, Ala., will establish a 100-ton ice plant. Oil-burning apparatus will be used. Robert Holcombe is manager.

M. C. Jackson, Gilbertown, Ala., will install a small cold-storage plant for meat refrigeration.

The Fruitdale Veneering Company, Fruitdale, Ala., will establish a plant for the manufacture of hampers, boxes and crates. J. P. Niles, E. D. Jordan, H. S. Withers, and others, are among the principals.

It is reported the Selma Spoke Company, Selma, Ala., will install machinery to manufacture wagon, buggy and automobile rims.

The National Grate Bar Company, Birmingham, of which Lewis Miner is manager, plans to build a plant for the manufacture of grate bars.

An an early date bids for construction work and machinery for the by-product ovens of the Chattanooga Gas & Coal Products Company, Chattanooga, Tenn., will be opened

and contracts awarded. The plant is to cost $450,000. The daily output is expected to be 400 tons of coke, 4000 gal. of tar and 11,000 lb. of sulphate of ammonia.

The Southern Refractory Company, Mission Ridge, Ga., has been incorporated by W. L. Greely, 183 West 135th street, New York; W. M. Barker, and others. They have purchased the plant of the Southern Products Company and will rehabilitate it. Mr. Barker will reside in Chattanooga and direct operations.

The Southern Lumber Company, Wauchula, Fla., has been incorporated and will rebuild a lately purchased plant besides installing a novelty works and a planing mill. W. F. Sneed is president. L. T. Wareing, W. E. Folsom, and others, are among the proprietors.

The Georgia Lumber Company, Byronville, Ga., is establishing a lumber plant at De Vaughan's station.

It is understood that the Anderson Lumber Company, Waycross, Ga., and others, are interested in the establishment of a lumber plant that will eventually cost $3,000,000.

Ozark, Ala., has sold $25,000 of bonds to be used to increase and enlarge the waterworks plant.

Pablo Beach, Fla., has voted $35,000 of bonds for sewerage purposes and $10,000 of bonds for an electric lighting plant.

Ocala, Fla., will sell $75,000 of waterworks plant improvement bonds on October 28.

St. Augustine, Fla., has voted $20,000 bonds for improving and enlarging the waterworks.

St. Louis

ST. LOUIS, MO., October 5, 1914.

The machine-tool market has shown continued improvement in tone, but there has been no appreciable increase in the actual business transacted, although the dealers continue to maintain a cheerful attitude and to express themselves as sure that the turning point will come as soon as cotton actually begins to move in quantities in the territory tributary to St. Louis. This section has felt practically none of the demand reported from other cities as coming from abroad, as a result of the war, but there are manufactures in this section which will feel the effects of foreign demand sooner or later, particularly electrical machinery, sugar mill equipment, etc., while demands which are being made upon flour and feed mills in this area are likely to lead to some local inquiry for milling equipment. Collections are reported satisfactory.

The Elsberry, Mo., Drainage District, of which the Harman Engineering Company, Peoria, Ill., is in charge, will install two 48-in. centrifugal pumps of maximum capacity of 75,000 gal. per min. against a static head of 14 ft., receiving bids until October 24.

The Koehler-Woodruff Auto Repair Company, St. Louis, has been incorporated with a capital stock of $12,000 by F. J. Koehler, Leslie Woodruff and H. J. Kroeger and will establish a repair plant for automobile work.

The Market Garage Company, Kansas City, Mo., has been incorporated with a capital stock of $18,000 by John Wurzer, T. A. Ferguson and Charles Mount, and will install equipment for auto repair work.

The Water, Light & Transit Company, Carrollton, Mo., will install one 300-hp. water-tube boiler and other equipment in its power house.

Tipton, Mo., is in the market for a 40-kw., 50-hp. low-speed generator with 3-kw. exciter. C. E. Clark is city electrician.

Kirkwood, Mo., will install in its electric light and power plant one 150-hp. boiler, one 100-kw. and one 150-kw. generator direct-connected to engines. W. A. Trussell is superintendent.

Smithville, Mo., has voted to install an electric light and power plant. The mayor should be addressed.

The Greenfield Electric Light & Power Company, Greenfield, Mo., has plans for the installation of an auxiliary generator for its plant.

Monroe City, Mo., will improve its electric light and power plant. O. R. Emerson is superintendent.

W. B. Rollins, Kansas City, Mo., will receive bids until about November 1 for constructing a water system for the town of Little River, Kan., to cost about $25,000.

Jones Bros. & Co., Rogers, Ark., have increased their capital from $400,000 to $1,000,000 to enlarge their cannery plants and extend operations.

W. L. Garner, Calico Rock, Ark., will install a cotton gin and is in the market for equipment.

The Butchers' Packing Company, Little Rock, Ark., has plans for a large abattoir in connection with its plant.

The Chamber of Commerce, Little Rock, Ark., has plans under way for the establishment of a cotton mill involving an investment of about $500,000.

John Dean and others have acquired the cotton-seed oil mill of the Empire Company, Guthrie, Okla., and will remodel it and increase the equipment.

Shattuck, Okla., will install one 100-hp. internal combustion oil engine in connection with its water and electric light plant.

The Cosden Pipe Line Company, Tulsa, Okla., has been incorporated with a capital stock of $250,000 by J. H. Yust, M. S. Sanford and E. R. Perry, and will equip a pipe line with pumping stations, etc.

J. P. Wheat, Vinita, Okla., is reported in the market for the necessary equipment for a planing mill.

The McOsker Topper & Ensilage Cutter Company, Enid, Okla., has been incorporated with a capital stock of $15,000 by S. D. McOsker, Aline; Clarence D. McOsker, San Antonio, Texas, and John W. Foster, Shattuck, Okla., to manufacture machinery.

The Oklahoma Overland Motor Company, Oklahoma City, Okla., has been incorporated with a capital stock of $20,000 by Samuel Johnson, Edgar C. Johnson and J. Rooney, and will equip an automobile repair plant.

Shattuck, Okla., will install a 100-hp. engine of the Diesel internal combustion type in its electric light plant. The mayor should be addressed.

An electric light and power plant and a waterworks plant will be installed at the Tuberculosis Hospital, Meridian, Miss.

The Meridian Car Works, Meridian, Miss., recently reported incorporated, will be a separate corporation from the Meridian & Memphis Railway, whose officers are stockholders.

A plant for the manufacture of slack barrel staves will be established at Greenville, Miss., by J. J. Russell, Memphis, Tenn.

The mayor of Houma, La., will receive bids on one 3-in. vertical discharge centrifugal pump, direct-connected to 20-hp. motor.

The Davis Wood Lumber Company, Lacombe, La., has been incorporated with a capital stock of $50,000 and will establish mills.

The Export Oil Corporation, New Orleans, of which J. A. Landry is manager, will expend about $1,500,000 erecting a refinery at Avondale, including a pumping station, etc.

An electric light and power plant will be equipped at Gibsland, La., under a franchise granted to H. M. Smith.

The Shreveport Overland Company, Shreveport, La., has been incorporated with a capital stock of $50,000 by W. H. Johnson, J. D. Youngblood and L. M. Howard and will equip a garage and repair shop.

Texas

AUSTIN, TEXAS, October 3, 1914.

Business conditions, especially the machinery and tool trade, show a good improvement over last week. This is true not only of Texas but of the entire Southwest. The cotton market situation is being gradually relieved and it is expected that prices of the staple will increase shortly. The hopes for a reopening of the machinery trade with Mexico have been dissipated by the new turn of events there.

The Farmers' Gin Company, Flaccus, will construct a cotton gin.

J. Livingston & Co., electrical engineers, New York, have opened offices in Houston. The capital stock is $50,000.

The Coleman Linter Company, Coleman, has been organized with a capital stock of $25,000 to do a manufacturing business. B. W. Couch is one of the proprietors.

The town trustees of Hagerman, N. M., are developing a water supply for the proposed municipal waterworks system that is to be built. Bonds in the sum of $16,000 have been voted for the purpose.

Machinery will be required for the manual training school that is to be erected in San Antonio by the school board.

It is announced by James A. Browne, owner of the street railway system at Brownsville, that he will construct a power plant and convert the lines from gasoline motor to electric transit.

The City Council of El Paso has awarded the contract for additional machinery for the municipal waterworks plant to the Fulton Iron Works, St. Louis, Mo., for $44,000. The capacity of the pumping plant will be increased from 2,000,000 gal. to 8,000,000 gal. per day.

The Jacksonville Grain & Commission Company, Jacksonville, will construct a flour mill, to cost about $20,000.

John Dean has purchased the oil mill of the Empire Seed Oil Mill Company, Guthrie, Okla., and will install new machinery.

San Francisco

SAN FRANCISCO, CAL., September 29, 1914.

The machinery business remains very quiet. Orders in practically all lines are of a small and scattering nature; but a gradual improvement is noted along some lines, reflecting either a healthy activity or an abnormal stimulation in particular industries. Those that have been especially accelerated so far are few, but the effect is broadening. The manufacture of food products is in the strongest position, resulting in a steady call for cannery equipment; and signs of expansion in the sugar industry are appearing, both here and in Hawaii. The manufacture of all kinds of packages—cans, boxes and barrels—is unusually active, although this has so far called for little new equipment. The implement trade is picking up, but is rather adversely affected by an uncertain outlook in regard to agricultural labor. The Panama Canal is greatly facilitating the shipment of Pacific coast products, and is already bringing tangible results in broadening the market.

In the machine tool and shop supply trade, it is noted that the smaller shops generally are busier than they have been, and are buying fairly well in a small way. Many new garages and repair shops are also being opened throughout the country. Hardly any large tools have been sold, however, and while tentative figures have been taken on some important projects, the larger buyers are still waiting. Woodworking machinery remains dull. Some substantial orders are appearing for pumping machinery; but there is nothing like the activity of last year. Manufacturers of gas engines report a fair local trade, while their business in Australia, New Zealand and South America has kept up in good shape.

Harron, Rickard & McCone, San Francisco, have taken an order for a 42-in. Niles boring mill for Stanford University, and are delivering a large lathe to the University of California.

The California Gear Works, Los Angeles, has been incorporated with a capital stock of $150,000, by J. H. Hayes, E. A. and C. L. Gardner.

The Brisco Iron Works, Lindsay, Cal., has been sold to the First National Bank of that place.

Louis Iverson has been buying equipment for a machine shop to be installed at Salinas, Cal.

It is reported that the Vermont Farm Machinery Company, Bellows Falls, Vt., will build a storage and distributing warehouse in Oakland.

The California & Hawaiian Sugar Company, San Francisco is making arrangements to double the capacity of its plant at Crockett, Cal.

The Alameda Sugar Company, Meridian, Cal., is making extensive improvements.

Charles L. Jolly, proprietor of the Santa Ana Machine Works, Santa Ana, Cal., is putting up a new shop building.

Reclamation District No. 70, Meridian, Cal., has placed a contract with the Yuba Construction Company, Marysville, for a 40-in. pump of 50,000 gal. per min. capacity; and with Fairbanks, Morse & Co., for a 300-hp. motor.

The pattern shop, machine shop and offices of Henry Dalton & Sons' foundry, on Tenth street, Oakland, were destroyed by fire on the night of September 27, with a loss of about $8000.

The city of Oakland has appropriated $4700 to purchase machinery for the municipal garage.

Plans are about complete for the Shredded Wheat Biscuit Company's factory at Fourteenth and Poplar streets, Oakland.

The city of San Francisco has awarded contracts to the George E. Dow Pumping Engine Company, the Compressed Air Machinery Company and the Deane Pump Company for additions and alterations to the municipal pumping stations.

Regarding recent rumors of a large lumber and woodworking plant to be installed at Stockton, Cal., it is learned that there is little immediate prospect of the project being carried out.

The Pacific Northwest

SEATTLE, WASH., September 29, 1914.

Financial conditions in Seattle are good, and business men and bankers are optimistic. Building operations are active. A good demand for building materials of all kinds is noted, and manufacturers of these lines report a busy season. A brisk demand for roadworking machinery is general. So far, however, no noticeably large purchases of any kind have been reported, and dealers do not look forward to any decided improvement until conditions are more settled. Manufacturers and dealers of mining machinery in Seattle have received a fair bulk of business. Several shipments of this kind of machinery have been sent to Alaska recently.

The sawmill plant of the Young & Johnson Company, Lake Kapowsin, Wash., was completely destroyed by fire recently, with a loss of $75,000. A. C. Young, Tacoma, president of the company, states that it will rebuild.

Mitchem Brothers, Spokane, Wash., will begin construction of a brick packing plant at Broadway and Mallon avenues. H. L. Mitchem is president.

The Pacific Iron Works, Portland, Ore., has awarded to John Altmeter, Railway Exchange Building, Portland, the contract for the construction of a one-story foundry and machine shop, 60 x 320 ft., a one-story and basement pattern shop, 50 x 100 ft., and a one-story structural steel shop, 62 x 520 ft. The company plans to install modern machinery gradually, including a 10-ton electric crane.

The International Portland Cement Company, Lakeview, Idaho, will expend $150,000 in the construction of a new tug, and installation of new machinery in its plant. A bond issue of $500,000 has been filed to cover this and other improvements to the plant.

The sawmill of the Eureka Lumber Company, Eureka, Mont., has been burned, with a loss of more than $100,000. All of the machinery was destroyed. Plans for rebuilding are under way.

The Pacific Coast Condensed Milk Company, Hillsboro, Ore., is having plans prepared for improvements to its plant, which will greatly enlarge its capacity. New machinery will be installed, and bids will be called soon.

The Pacific Power & Light Company, Astoria, Ore., announces that it will start work at once on the erection of a power plant to cost about $50,000. William H. Galvani, engineer, Astoria, will have charge of the construction work.

The Evans Light Company, Malad, Idaho, will construct a power plant. Active construction will begin soon.

The Grant Smith Company, North Yakima, owner of a wood-working plant, has increased its capitalization to $25,000, and will begin work on an additional reinforced concrete mill building. Some machinery will be required.

The plant of the Adams-Coleman Lumber Company, Entiat, Wash., was recently damaged by fire to the extent of $45,000. Valuable machinery was destroyed.

Hammond & Fry, 722 Bell street, Seattle, will install a sawmill at one of their mines.

The Wood Livestock Company, Spencer, Idaho, of which F. J. Hagenbarth is president, has been granted a certificate of public convenience and necessity and will begin the erection of an electric generating plant.

Low bid for supplying the gantry crane for the Smith's Cove project, part of the port of Seattle improvement work now under way, was submitted by the Shaw Electric Crane Company, Muskegon, Mich., for $40,921, with an alternate bid of $38,590. Other bidders were the Brown Hoisting Company, $48,200, and the Toledo Bridge & Crane Company, $52,500.

The plant of the Doty Lumber & Shingle Company, Chehalis, Wash., was damaged by fire recently, with a loss of more than $30,000 in buildings and machinery.

Western Canada

WINNIPEG, MAN., October 1, 1914.

The Western Canada Cordage Company, Ltd., Calgary, Alberta, has been incorporated with a capital stock of $500,000 to manufacture cord, twine, etc.

The new Medicine Hat, Alberta, plant of the Maple Leaf Milling Company is now completed and the machinery will be installed at once so as to have the plant ready for operation by December 1, or in time to take care of part of this year's crop.

The Western Canada Flour Mills, Ltd., has decided to enlarge the plant at Calgary, Alberta, and also to rebuild and double the capacity of its oatmeal plant. A 700-hp. steam power plant will be installed. The capacity of the flour mill will be increased from 400 to 1200 bbl. per day.

The North Alberta Lumber Company, Edmonton, Alberta, is contemplating the installation of a 1000-hp. generator for power and lighting purposes.

Plans are being prepared by engineers of the Dominion Shipbuilding, Drydock & Engineering Company, Canada Life Building, North Vancouver, B. C., for the erection of another unit to the company's proposed plant on the north shore. Bids will be invited almost immediately.

The Amalgamated Engineering Company, Victoria, B. C., will commence the construction of a shipbuilding and drydock plant to cost $5,500,000. A subsidy was granted to the company by the Dominion Government a short time ago.

The McLaren Lumber Company, Blairmore, Alberta, which was recently making arrangements for the erection of a mill to cost $200,000, announces that it has decided to let the matter stand over until next year.

The J. D. McArthur Lumber Company's plant at Winnipeg, Man., was damaged by fire to the extent of $125,000. A large amount of machinery was destroyed.

The ratepayers of Saanich, B. C., passed a by-law to grant $375,000 for a waterworks plant.

Eastern Canada

TORONTO, ONT., October 3, 1914.

The United Gas & Fuel Company will soon commence work on its new plant to be erected at Hamilton, Ont., at a cost of $1,500,000.

The plans have been completed for the factory of the Ideal Concrete Machinery Company which will be erected at Windsor, Ont.

The Sarnia Metal Products Company, Ltd., Sarnia, Ont., has been incorporated with a capital stock of $100,000 by Morris S. Babcock, Malcolm MacKenzie, Lloyd Lott, and others, to manufacture sheet metal goods, metal sidings, etc.

The Detroit Fuse & Mfg. Company has been incorporated in Ontario with a capital stock of $15,000 to manufacture electric motors, dynamos and other electrical machinery, etc. It has appointed Walter G. Bartlet, Windsor, Ont., to be its attorney.

The ratepayers of Bedford, Que., have passed a by-law to grant $35,000 for extensions to the waterworks plant. Bids will be called for the construction work next spring.

The Imperial Pipe Line Company, Ltd., Sarnia, Ont., has been incorporated with a capital stock of $1,000,000 by James H. Archibold, H. V. Otto, Norman L. LeSueur, and others, to manufacture and refine petroleum, etc., and to manufacture machinery, incidental to the operations of the company.

The P. Golinas & Cie, Ltd., St. Bonifice de Shawinigan, Que., has been incorporated with a capital stock of $45,000 to manufacture machinery, etc.

The ratepayers of Peterboro, Ont., passed a by-law to grant $73,000 for the construction of a sewage plant.

The Hawkesbury Board & Paper Mills, Hawkesbury, Ont., will soon commence the construction of a new mill.

Bids will be called by the Town Council, Fraserville, Que., in December or January for additions to the power house, including waterwheel, dynamos and motors to cost $25,000. E. Talls is town clerk.

The Louison Lumber Company, Ltd., Jacquet River, N. B., whose mill was recently destroyed by fire, is building a new plant. New machinery will be required.

The Besselle Lumber Company's mill at Conception, Que., was totally destroyed by fire.

President Chamberlain, of the Grand Trunk Railway Company, has announced that his company has decided to build one of the largest drydocks in the country at Prince Rupert, B. C., at which a 20,000-ton battleship can be docked. Work will be started January 1. A complete shipbuilding plant will be in full swing shortly after the first of the year. A large amount of machinery will be used.

Government Purchases

WASHINGTON, D. C., October 5, 1914.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until October 27, schedule 7400, one alternating current generator set with direct current motor for Annapolis; schedule 7404, 10 pneumatic jacks suitable for use on Hilles & Jones plate planer No. 7 and eight pneumatic jacks suitable for use on Niles Tool Works planer, all for Boston; schedule 7406, eight 4 x 2½ x 4-in. vertical simplex pumps and spare parts for boiler feed for Norfolk; until November 3, schedule 7407, five 48-in. lathe heads complete with face plates and motor drivers for head and center screws and one 25-in. open-back belt-driven nailing machine, all for Washington, D. C.; schedule 7408, two motor-driven cold-sawing machines for Brooklyn; schedule 7409, one universal double-arbor saw bench with 16-in. jaws and complete equipment, one 24-in. hand planer and jointer complete with equipment, one wood trimmer with 18 x 34-in. bed and two wood trimmers for bench use with bed 9 x 24-in., all for Philadelphia.

The paymaster-general of the navy, Washington, will open bids October 13, schedule 7291, class 1, for ice-making machines and accessories for Brooklyn, and schedule 7301, class 11, for eight convertible type motor-driven fans for Mare Island: alternate for the same f.o.b. works.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, September 29, for supplies for the navy yards as follows:

Schedule 7282, steam engineering, class 121, Brooklyn—One set plate-bending rolls—Bid 17, $603; 78, $732.50; 79, $690 and $650; 89, $739.80; 110, $915, $775 and $705; 114, $925; 116, $785 and $795; 120, $848; 131, $713 and $750; 134, $825; 145, $1595 and $1670; 186, $715.

Schedule 7294, ordnance, class 161, Washington—Two drop hammers—Bid 12, $4650 24, $7193; 51, $5500; 110, units; 114, $1085, part; 116, $4650; 117, $1400; 144, $4854; 152, $1400, part, and $1360, part; 154, $4100; 157, 14.35c. and 13.85c., units on item 2; 164, $1117; 170, $3300.

Class 162, Washington—One cutting machine—Bid 24, $1600; 110, $1580 and $1555; 116, $1530 and $1485; 154, $1160.

Schedule 7295, ordnance, class 163, Washington—One universal shaping machine—Bid 19, $1055; 74, $930; 89, $1181.60, $1057 and $947.50; 110, $1180, $1190 and $1168; 114, $1070; 116, $930; 124, $915; 141, $952.

Class 164, Washington—One sawmill—Bid 1, informal; 2, $900 and $1025; 18, $3736.15; 19, $965.50; 43, $499.50; 54, $1200; 59, $2379.10; 110, $1075 and $1025; 116, $1130.

The names of the bidders and the numbers under which they are designated in the above list are as follows:

Bid 1, American Saw Mill Machinery Company; 2, Aumen Machinery Company; 12, Billings & Spencer Company; 17, Bertsch & Co.; 18, Berlin Machine Works; 19, F. A. Branda & Co.; 24, E. W. Bliss Company; 43, Diamond Iron Works; 51, Erie Foundry Company; 54, Frick Company; 59, J. A. Fay & Egan Company; 74, Hill, Clarke & Co.; 78, Huntington Machine & Foundry Company; 79, Hilles & Jones Company; 89, Kemp Machinery Company; 110, Manning, Maxwell & Moore; 114, Niles-Bement-Pond Company; 116, D. Nast Machinery Company; 117, Nutter & Barnes Company; 120, George A. Ohl Company; 124, Potter & Johnston Machinery Company; 131, Prentiss Tool & Supply Company; 134, Joseph T. Ryerson & Son; 141, Springfield Machine Tool Company; 144, Swind Machinery Company; 145, William Sellers & Co.; 152, Standard Milling Company; 154, Toledo Machine & Tool Company; 157, United Engraving & Foundry Company; 164, Vulcan Engineering Sales Company; 170, William White & Co.; 186, D. H. Stoll Company.

The Harvester Decree Amended

The decree of the United States District Court handed down last August ordering the dissolution of the International Harvester Company under the Sherman anti-trust law was amended in a decision given at St. Paul October 3 by Judges Sanborn, Hook and Smith, the trial judges, which alters the decree so as not to apply to the foreign trade of the company and changes the original plan of dissolution. After the announcement of the decision, counsel for the Harvester company gave notice of appeal to the United States Supreme Court from the dissolution decision of the court as amended.

The first amendment made by the court orders the words "and with foreign nations" struck out wherever they appear in the decree, but the court distinctly reserves its power over the property and business of the company "so far as lawful and necessary to effect a dissolution of the combination."

The amendment regarding the plan of dissolution was first stipulated between the Attorney General of the United States and the attorneys for the defendants. The original decree made it compulsory for the company to lay before the court a plan for the separation of the company's business and assets into at least three separate corporations. Under the amendment the specific number three is eliminated and the plan to be drawn is to provide for division of the company's interests "in such manner and into such number of parts of separate and distinct ownership as may be necessary to restore competitive conditions and bring about a new situation in harmony with law."

The Canton Sheet Steel Company, Canton, Ohio, is making a number of improvements to its plant, which will increase its capacity about 50 per cent. A structural steel addition to its galvanizing department, 70 x 129 ft., is being erected and also a structural steel fireproof warehouse. The company will be able to carry a much larger stock so as to make more prompt deliveries to the trade.

Trade Publications

Machinery Guards.—L. F. Grammes & Sons, Allentown, Pa. Pamphlet. Lists a number of different types of safe guards for punch presses, shaping and jointing machines and circular saws. All of the different forms of guards are illustrated and briefly described with tables of the different sizes in which they can be supplied. The guards for the saws and the shaping machines are all designed for suspension from the ceiling. An illustrated description of one of the guards for a circular saw appeared in *The Iron Age*, May 21, 1914.

Drill Chucks.—Wahlstrom Tool Company, 346 Carroll street, Brooklyn, N. Y. Folder. Calls attention to an improved form of automatic chuck for drills in which it is possible to insert or remove a drill without stopping the spindle. The special features of the chuck are a simple mechanical construction and rapidity of operation. A view of the chuck which was illustrated in *The Iron Age*, May 21, 1914, is presented with the main parts marked.

Counters.—C. J. Root Company, Bristol, Conn. Catalogue. Illustrations and descriptive matter explain the use of a very extensive line of automatic counting machines in a great variety of industrial plants. The illustrations show the counters in use, the captions making clear the purpose for which they were installed. Following this a general description of the machines is given, together with illustrations of the various styles that are furnished. A partial list of the uses of these devices and the machines to which they are attached is included.

Temperature Control Device.—Gas Appliance Sales Company of America, 1209 Arch street, Philadelphia, Pa. Three circulars. Mentions the use of the Robertshaw thermo-valve in connection with blast furnaces, lead hardening pots and direct-heated japanning ovens. In all of the circulars views are given of the device as applied, together with a diagrammatic drawing. A brief description of the use of the valve and the way in which it is installed is included in each.

Steam Pumps.—Columbus Steam Pump Works Company, Columbus, Ohio. Catalogue. Describes and illustrates a number of different types of steam pumps and pumping machinery, which includes single-cylinder double-acting light and heavy duty, mining, centrifugal and duplex steam pumps, as well as a combined boiler and pump, and a combined automatic feed pump and receiver. After these brief descriptions illustrations of the various pumps are presented with tables of specifications on the facing pages. A numbered list of parts is included for convenience in ordering repairs.

Filter Presses.—D. R. Sperry & Co., Batavia, Ill. Pamphlet. Presents illustrations and brief descriptions of a line of filter pumps that are made in a number of different styles, a pair of facing pages being devoted to each. In the descriptions, the outside dimensions of the plate and the filtering area are given, together with maximum thickness of the cake and the working pressure employed. A number of illustrations of different types of plates and frames that can be used are presented, together with directions for setting up and piping the press and a partial list of users.

Iron Bars.—Slatington Rolling Mills, Slatington, Pa. Folder. Concerned with a line of iron bars that are made from a special puddle mixture in round, square and flat shapes. The various sizes of each kind of bar that are rolled are given, together with a card of extras on the different sizes and shapes.

Magnetic Chucks.—Heald Machine Company, Worcester, Mass. Catalogue. Describes the construction of magnetic chucks and their application for holding work in various machines. Illustrations of both the rotary and flat types of chucks are presented, together with views of them in use. The special features of these chucks, which were illustrated in *The Iron Age*, July 2, 1914, include a large, uniformly distributed holding power and the ability to handle a wide range of large and small work without changing the faceplate.

Nut Lock.—United Nut Lock Company, Springfield, Mass. Three circulars. Give illustrations and brief descriptions of a number of types of nut locks for various purposes.

Power Transmission Machinery.—Hill Clutch Company, Cleveland, Ohio. Catalogue No. 11. Illustrates and describes a complete line of power transmission machinery for belt and rope drives, including shafting, bearings, couplings, hangers, floor stands, friction clutches and pulleys. Illustrations of the various appliances are given, together with dimension diagrams and tables in some cases. Tables for laying out shafting and the horsepower that can be transmitted by leather belts are included, together with suggestions for ordering clutch pulleys and couplings.

Gas Producers.—Wellman- Seaver - Morgan Company, Cleveland, Ohio. Catalogue. Is not intended as a treatise on gasmaking, but sets forth the construction and advantages of the Hughes mechanical gas producer. After a brief introduction the general construction and operation of the producer are gone into at some length, the text being supplemented by numerous engravings of the parts of the producers, as well as a plant in which 12 units are installed.

Metallic Packing.—Metallic Packing & Mfg. Company, Elyria, Ohio. Catalogue G and folder. The first points out the advantages of using a line of metallic packing for steam and gas engines, pumps, hydraulic presses and air compressors. After a brief statement of these features a number of views of the different styles of packing that can be supplied are presented with brief descriptions. The folder calls particular attention to the use of metallic packing on hydraulic pumps to eliminate friction and shows its construction. The special advantages claimed for these packings are a reduction in cost, due to long life of the packing and the elimination of friction. An illustrated description of this pump packing appeared in *The Iron Age*, November 28, 1912.

Pneumatic Tools.—Independent Pneumatic Tool Company, Thor Building, Chicago, Ill. Circular V. Describes a line of pneumatic tools which includes roller bearing piston air drills; chipping, calking and flue beading hammers; staybolt drivers, air hose, couplings, etc. There is comparatively little text in the circular, the story being told chiefly by illustrations of the different tools with descriptive captions. The engravings of some of the tools show them in actual use.

Ammonia Regenerator.—Vilter Mfg. Company, Milwaukee, Wis. Bulletin No. 23. Calls attention to a device for keeping the ammonia in a refrigerating system in an anhydrous condition. The construction, installation and operation of the device are described at some length and the text is supplemented by a diagram showing the connections between it and the refrigerating system. The special advantages claimed for the regenerator are that the ammonia is kept free from oil and other impurities and the maintenance of low temperatures.

Steam Specialties.—W. D. Garrett & Co., 136 Liberty street, New York City. Catalogue No. 20. Lists an extensive line of steam specialties, which includes pump governors, exhaust heads, steam and hot water heaters, pressure and damper regulators, oil and steam separators and valves of various makes. The catalogue is made up of a number of separate bulletins, each of which relates to one of the devices. In each of the bulletins illustrations and brief descriptions of the devices are presented, together with tables of dimensions and capacities.

Friction Clutches and Cut-Off Couplings.—O. K. Clutch & Machinery Company, Columbia, Pa. Two folders. The first pertains to a line of clutches and couplings of the friction type and contains illustrations and dimension drawings, together with a table of specifications. These clutches are designed for use in connection with lineshafts for the starting and stopping of machines. The other embodies illustrations, both assembled and taken apart, of a clutch pulley for internal combustion engines, together with a table of the sizes in which it is made.

Drilling Machines.—Francis Reed Company, 43 Hammond street, Worcester, Mass. Collection of loose leaf circulars. Illustrate a line of drilling machines that ranges from the small bench type up to multiple-spindle sensitive machines with six spindles. A separate circular is devoted to each of the different styles of machines and contains an illustration, brief description and condensed table of specifications.

Industrial Furnaces.—W. S. Rockwell Company, 50 Church street, New York City. Card hanger. Calls attention to the service which this company is prepared to furnish in the selection of the proper furnaces and fuel for various industrial operations, the work including plant inspection and the devising of methods and means of working, the preparing of plans and the furnishing of complete industrial furnace equipment, using either coal, gas, coke or oil as fuel. The reverse side of the card contains a comparative scale of the Fahrenheit and Centigrade thermometers, together with the conversion factors and a table of tempering and hardening heats.

Oxygen and Hydrogen Plants.—Compressed Gas Machinery Company, Buffalo, N. Y. Pamphlet. Refers to the manufacture of oxygen and hydrogen in industrial plants where the gases are to be used by the Sürth or filter press system. The advantages of this system, which employs electrolysis of water for the production of gases are briefly touched upon, the text being supplemented by a number of illustrations of the apparatus used.

Vise Hold-Downs.—Ready Tool Company, Bridgeport, Conn. Circular. Points out the advantages of using the Red-E shaping or milling machine vise hold-downs which consists of but three parts, a back, a finger and a concealed spring. Illustrations of the hold-down in use are given, together with a drawing showing the way in which the work is placed between the fingers and forced into position.